Sample reports of the fieldwork/ sample photographs of the fieldwork/permission letter only for internship/ project fieldwork from the competent authority.

Atmiya University Rajkot

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Atmiya University
Rajkot

Sample Reports of the fieldwork / Internship

ATMIYA UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

CIVIL DEPARTMENT

An Internship Report On

"SHREE SHAKTI CHARITABLE TRUST"

Under subject of Report of Successful Completion of 90-hour's Social Internship

Internship Training
Semester-4

Submitted by:
Aryan Topiya (221001016)

Mentored by:
Hardik Pujara

Head of the Department
Dr. Hemant Sonkusare

Academic Year (2022-23)

ATMIYA UNIVERSITY

CERTIFICATE

Date: 29-05-2023

This is to certify that the Social Immersion Internship has been carried out at **Shree Shakti Charitable Trust** by **Aryan Topiya** from **17th May to 28th May** under partial fulfillment of the program during the academic year 2022-23.

Signature of Mentor:

Harshik Priyara

Name of Mentor

Head of Department
Department of Civil Engineering
Faculty of Engineering & Technology
Atmiya University
Rajkot

Social Immersion Internship Certificate from Organization

॥ જય શક્તિ માં ॥ ॥ જય ખોડિયાર માં ॥ ॥ જય મેલડી માં ॥

• રજી. નં. ૯૮૨૫ •

શ્રી શક્તિ ચેરીટેબલ ટ્રસ્ટ-રાજકોટ.

Mo. : 84602 80888 / 84603 80888

તારીખ :

Date: 29-5-23

Certificate of Completion

This is to certify that the Social Immersion Internship has been carried out at Shree Shakti Charitable Trust by Aryan Topiya (221001016), student of Civil Engineering department from 17th May to 28th May under partial fulfillment of the program with involvement in social immersion course component during the academic year 2022-23.

He has completed 90 hours of internship during above mentioned time span. He performed/involved in following activities (if any specific work given).

i) Giving food to needy

ii) Giving medicine to needy with the help of certified doctor

During the tenure with us, we found him sincere, responsible and contributor to the society.

Stamp

Signature of Supervisor/Manager

પ્રમુખ / ઉપપ્રમુખ / મંત્રી.

શ્રી શક્તિ ચેરીટેબલ

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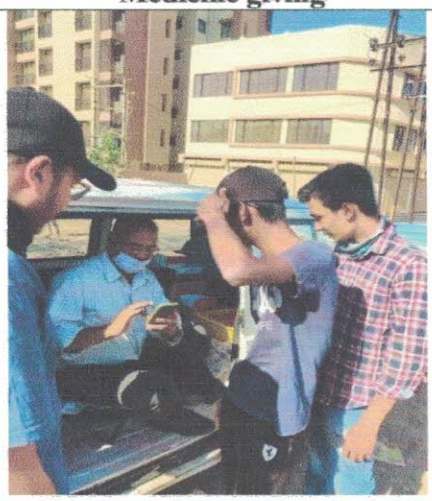	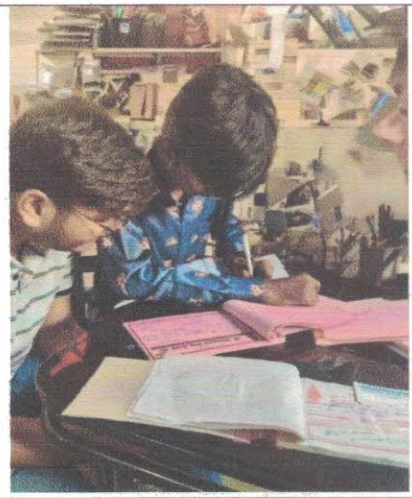
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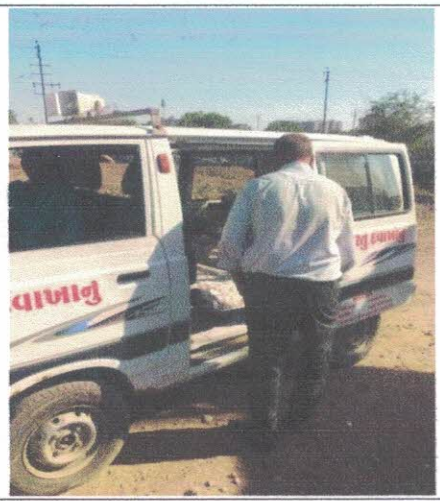
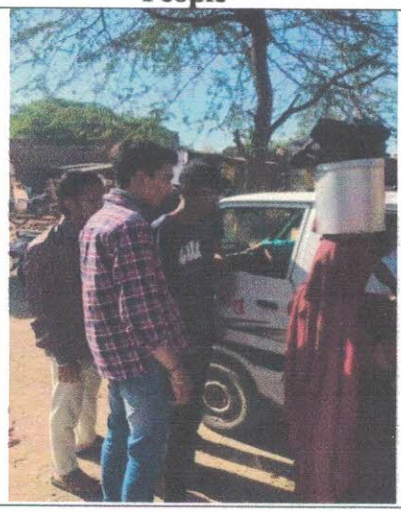
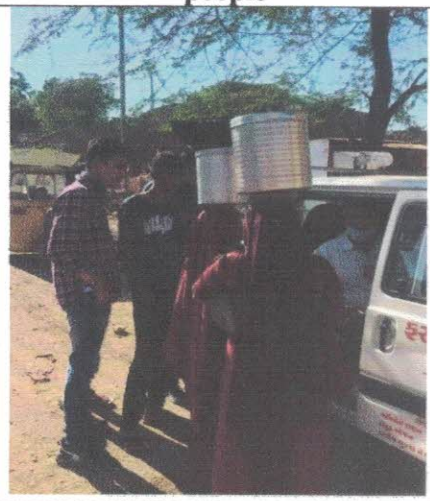
	
Charitable Trust	**Location**
	

People	people
	

Organization Profile

The Shree Shakti Charitable Trust is a organization that is committed to enhancing the quality of life, for underprivileged individuals. Their mission involves offering food donations to those, in need and providing medications through the assistance of doctors.

Organization Activity

During my internship, with Shree Shakti Charitable Trust, which lasted for a total of 90 hours I actively engaged in two activities; providing food donations to those in need and assisting certified doctors in distributing medicines.

When it came to food donations my responsibilities included collecting organizing and distributing food to shelters and impoverished areas.

As for the medicines I worked closely with doctors to acquire and distribute medications among individuals.

Overall this internship provided me with the opportunity to contribute towards the trusts mission while also gaining insights, into addressing issues.

Organization's Day-to-Day Schedules

During the 90-hour's's social internship at Shree Shakti Charitable Trust, the day-to-day schedule was organized as follows:

- Morning Session:

- From 9:00 am to 1:00 pm our main focus during the morning session was to provide aid to those in need. We actively engaged in tasks such, as organizing camps registering patients supporting doctors and distributing prescribed medications.

- Afternoon Session:

- 4:00 pm to 8:00 pm: The focus of the afternoon session was providing food for the less fortunate. We took part in tasks including gathering and packaging food supplies, working with volunteers, and ensuring that everything was distributed properly to the intended recipients.

Due to this schedule, we were able to obtain practical experience in both administering necessary medications and aiding with food donation activities.

Activity/Work Description

The activity carried out at the trust was donating food and providing essential medicines to individuals in need with the assistance of certified doctors. The following is a description of the work involved in each activity:

- Donating Food to the Needy:

- Assisted the group in planning food donation drives, contacting possible contributors, and assuring the efficient collection and delivery of donated goods.

- Helped with sorting and packaging the food products that were collected, adhering to hygienic standards and classifying the food according to kind and expiration dates.

- Took part in the distribution process by going to homeless shelters, community centers, and underprivileged neighborhoods to provide meals to people and families who were struggling with hunger.

- Providing Medicines to the Needy:

- Consulted with licensed physicians who volunteered their time and skills to evaluate the recipients' medical requirements.

- Assist with setting up distribution points where people could pick up their prescription prescriptions, making sure all paperwork was in order and that safety procedures were followed.

- Actively engaged in healthcare professional's training seminars where they gave advice on how to take medications, possible side effects, and general health knowledge.

Learning Outcomes

- Understanding Food Insecurity: I gained insight into the challenges of food insecurity and the impact of community support in addressing this issue.

- Collaboration and Coordination: I learned effective communication and coordination skills by working with team members, volunteers, donors, and beneficiaries.

- Healthcare: Assisting in providing medicines with certified doctors deepened my understanding of healthcare challenges faced by poor individuals.

- Empathy and Sensitivity: Interacting with those in need cultivated empathy and sensitivity towards diverse circumstances and challenges.

- Problem-Solving and Resource Management: I developed problem-solving skills, managing limited resources efficiently to meet the beneficiaries' needs.

- Documentation and Reporting: Preparing reports improved my skills in organizing and summarizing information accurately.

Unique Experience Worth to project in report

During my 90-hour's social internship I had a remarkable experience that stands out. An opportunity to provided food and medical assistance to the residents who had limited access to basic resources.

This unique experience emphasized the significance of working closely with local communities and empowering them to create sustainable change.

Overall, this experience highlighted the potential for positive impact through collective efforts, and it will always hold a special place in my heart as a reminder of the power of compassion and community-driven initiatives.

Acknowledgment

In order to properly thank the Shree Shakti Charitable Trust for allowing me to complete a 90-hour social internship, please accept my sincere gratitude. I truly appreciate the committed team's advice and assistance throughout the internship.

A special thanks goes go to the licensed physician, volunteers, and contributors who made a significant contribution to the distribution of food and medical care to people in need. The beneficiaries' lives have been significantly impacted by their unselfish actions.

I appreciate the donations and assistance from the Shree Shakti Charitable Trust throughout my social internship.

References

1. Shree Shakti Charitable Trust
2. Certified doctors who volunteered their time and expertise
3. Team members and staff at Shree Shakti Charitable Trust
4. Volunteers and donors

Project Report

FORMULATION AND EVALUATION OF ANTIBACTERIAL HERBAL EMULSIFYING GEL

Submitted to

ATMIYA UNIVERSITY

by

ANUJA BARASARA (200501002)

8th Semester, B.Pharm

School of Pharmaceutical Sciences,

Faculty of Health Sciences, Kalawad road,
Rajkot – 360005, Gujarat, India

Under the guidance of

Dr. Mital Manvar

Associate Professor,

School of Pharmaceutical Sciences,

Faculty of Health Sciences, Kalawad road,

Rajkot – 360005,

Gujarat, India

2023-24

ATMIYAUNIVERSITY

Faculty of Health Sciences

School of Pharmaceutical Sciences

"Yogidham Gurukul", Kalawad Road, Rajkot – 360005. (Gujarat, India)

CERTIFICATE

This is to certify that **MS.ANUJA BARASARA** Enrollment No. **200501002** has successfully completed project on **"FORMULATION AND EVALUATION OF ANTIBACTERIAL EMULSIFYING HERBAL GEL"** as part of curriculum of B.pharm **Semester - VIII** in the subject Project Work during the academic year 2023 –24.

12/04/2024

Sign. of Supervisor

18/4/24

Sign of examiner

Dean

School of Pharmaceutical Sciences
Atmiya University
Rajkot

Declaration

hereby declare the Work is presented in the project report entitled **FORMULATION AND EVALUATION OG ANTIBACTERIAL HERAL EMULSIFYING GEL**

It is an authentic record of work carried out by us during the studying period of semester 8 at and under the guidance of Atmiya University, Rajkot, and is being submitted for partial fulfillment of the requirement for the award of a bachelor's degree in B.pharm. This is not submitted anywhere else for the award of any other degree/diploma.

ANUJA BARASARA

Title :	**FORMULATION AND EVALUATION OG ANTIBACTERIAL HERAL EMULSIFYING GEL**
Enrollment no.:	200501002
Name of Guide: **Institute**	Dr. Mital Manvar School of Pharmaceutical Sciences
University	Atmiya University
Date of Submission	18/04/2024
Guide by	Dr. Mital Manvar Associate Professor, School of Pharmaceutical Sciences, Faculty of Paramedical Sciences, Kalawad Road, Rajkot – 360005, Gujarat, India
Submitted by	ANUJA BARASARA School of Pharmaceutical Sciences, Faculty of Health Sciences, Kalawad Road, Rajkot – 360005 Gujarat, India

18/04/24

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Acknowledgment:

we would like to express our sincere thank to Atmiya university for helping out by providing various facilities and guidance for successfully completing our project. We are grateful to School of Pharmaceutical Sciences for the completion of the project.

It's my immense pleasure to express my deep sense of gratitude and indebtness to our respected and esteemed guide Dr. Mital Manvar, Assistant Professor, School of Pharmaceutical Sciences, Faculty of Paramedical Sciences, Atmiya university, Rajkot for her unflagging encouragement, invaluable guidance, worthy suggestions, crucial help and their own untiring efforts in totally informal atmosphere which infused in a spirit of dedicated hard work in me and never let me fluctuate during the course of research work. Apart from his guiding abilities his friendly attitude, care, concern trust and faith in me were additional motivating factors that allowed me to expand my knowledge in the subject.

It's my with a great sense of gratitude, we would like to thank our Co-Guide Dr. Kevin Garala Associate Professor, and ms. Rachna joshi Assistant professor School of Pharmaceutical Science, Faculty of Paramedical Sciences, Atmiya university, Rajkot and also our practical mentors Mr. Rajiv Shukla and Ms. Varsha Kyada for their valuable suggestions, guidance and their genuine interest in this research project which made it possible me to complete the work.

Abstract:

- Background: *Tridax Procumbens* Linn ,Clove oil and Neem seed are well known for its traditional use as Ayurveda in folk medicine all over the world. These plant have many pharmacological activities like hepatoprotective activity, anti-inflammatory activity, wound healing, anti-diabetic activity, hypotensive effect, immunomodulating property, promote the growth of hair, prevent falling of hair and anti-microbial activity.
- Aim: Development and evaluation of antibacterial herbal Emulsifying gel.
- Methodology: After authentication of the plant, extract was prepared from the leaves of *Tridax procumbens* and essential oil like neem seed oil and clove oil. And dosage form is prepared and were tested against some standard strain of Bactria like Streptococcus aureus, Bacillus subtitis, Escherichia coli, P. Vulgaris.

- bacteria like Streptococcus aureus, Bacillus subtitis, Escherichia coli, P. Vulgaris Result: The plant extract of Tridax procumbens, clove oil and Neem seed oil responds against
- Conclusion: Prepared formulation have good antibacterial activity. It may be also prevent bacterial infection.

Rational:

Nowadays, most of drug are resist to bacteria toward antibiotics. So the alternative treatment are investigated and adopted. So we try to formulate a new formulation.

As far as dosage from is a matter of concern, gel become a good option. Gel has several advantages over the other dosage forms. Gel is semisolid system consisting of dispersions of small or large molecules in an aqueous liquid vehicle rendered jelly like by the addition of gelling agent. Advantage of gel dosage form over other dosage forms are less irritant, softening the skin and easy to removal.

Objective :

- To formulate a herbal gel using Tridax procumbens extract, clove oil and Neem seed oil.
- To evaluate physicochemical parameters of the prepared herbal formulation.
- To evaluate antibacterial activity of the prepared herbal formulation.

Introduction:

Traditional medicinal knowledge and its use for finding active chemical structures for medicine is necessary to have co-operative efforts between modern and traditional health workers and researchers. In developing countries, traditional medicine occupies a central place among rural communities but enough information is not available about the chemical composition and real biological possibilities of most of the plants traditionally in use.[1-2]

For countries plants have been used for both nutritional and medicinal purposes. In conventional medicine is not cheap and a large population of the people depends on traditional medicine for their healthcare needs. Over the years, these herbal drugs have been shown to be effective. Many plants and their parts are used for the treatment of various diseases in different parts of the world and are being screened for antimicrobial activities and the result obtained from these scientific studies have aided in the rationalization of medical use of these parts.[2-3-4]

Infection of the skin and soft tissues are frequent ailments that cause significant morbidity. Microbes like bacteria and fungi frequently work together to cause this infection. Using topical antimicrobials is a desirable method of treating superficial skin infections. Topical therapy has minimal to no systemic side effect while delivering a high concentration of a medicine to the targeted location.[5-6]

Resistance in micro-organisms to many antimicrobials has resulted in morbidity and mortality from treatment failure and increased health care costs and increasing capability of microbes to develop multidrug resistance has encourage search for new, safe and effective bioactive agents of herbal origin. It has been reported that ***Tridax procumbens*** medicinal plants have been used in the treatment against different diseases.[7]

1.LITARATURE REVIEW OF PLANT :

1.1TRIDAX PROCUMBENS

India's rice fields are home to the common weed *Tridax procumbens*. It is a plant that is generally referred to as "coat button" and is present all over India. Historically*, Tridax procumbens* leaf juice has been applied topically to treat wounds. The plant's leaf juice, which has antimicrobial properties, can be used to treat fresh wounds, stop bleeding also as a hair tonic.[8]

Distribution:

- The plant is native of tropical America and naturalized in tropical Asia, Africa, Australia and India.[9]
- It *Tridax procumbens* is an annual or perennial herbaceous weed found in tropical and subtropical areas of the world, growing mainly during the rainy season at meadows, croplands, disturbed areas, lawns, roadside or settled areas. This medicinal herb shows a typical feature of a beneficial weed.[10-11-12]

[Fig. 1 Tridax procumbens]

1.1.1 Morphological structure:

Leaves:

leaves are opposite, simple, carried by a petiole, 1 to 2 cm long. They are thick, soft and dark green. The lamina is oval to lanceolate, 2 to 6 cm long and 2 to 4 cm wide, base attenuate in the corner and with strongly and irregularly serrated margin. Both sides are hispid, with tuberculate based bristles. Wedge shaped base leaf, shortly petioled, hairy on both surfaces.

[Fig. 2 Tridax procumbens leaves]

Stem & root:

Stem is cylindrical, hispid, branched, sparsely, hairy, rooting at nodes. The plant stem is ascending 30-50 cm height and covered with multi cellular hairs of 1 mm; tuberculation at the base. The root is a strong taproot system.

[Fig. 3 root of Tridax procumbens]

[Fig. 4 stem of Tridax procumbens]

Flowers:

The plant blossoms resemble daisies. The tubular flower has 3 toothed ray florets and white or yellow blossoms with a yellow center. It has two different flowers types: disc florets with basal placentation and ray florets. The flowers can occasionally have 3 lobs and lengthy, pendulous crowns. Black, 2.0-2.5 mm long, narrowly obconical achenes with feathery pappus. All year long this is flowering.

[Fig. 5 flower of Tridax procumbens]

Fruit:

Fruit is a conical hard achene covered with stiff hairs and having a feathery. Fruit id 3.5 mm high, pubescent and brown to black at maturity. At one end it has plume like white pappus.

Seed:

The plant seeds have pendulous embryo, endosperm is absent.[13-14]

[Fig. 6 seed of Tridax procumbens]

1.1.2 Taxonomic classification:[15]

- Kingdom: Plantae
- Sub-kingdom: Tracheobionta
- Division: Spermatophyta
- Sub-division: Magnoliophyta
- Class: Magnoliopsida
- Sub-class: Asteridae
- Order: Asterales
- Family: Asteraseae
- Genus: Tridax
- Species: procumbens

1.1.3 Vernacular names: [16-17-18]

Region / Country	Common name
English	Coat button, Tridax daisy
Gujrati	Ghaburi
Hindi	Ghamra
Sanskrit	Jayanti Veda
Latin	Tridax procumbens Linn.
Tamil	Thata poodu
French	Herbecaille
Chinese	Kotobukigiku
Bengali	Tridhana

[Table 1 vernacular name of Tridax procumbens]

1.1.4 Chemical constituent:

- Flavonoids, alkaloids, carotenoids, hydroxycinnamates, lignans, benzoic acid derivatives, phytosterols, tannins, terpenoids, crude protein, crude fiber, soluble carbohydrates and calcium oxide are said to be present in the leaf and other parts of T. procumbens L. There have also been reports of fumaric acid, beta sitosterol, and the pentacyclic triterpenoid oleanolic acid.[19]
- In floral extracts, luteolin, glucoluteolin, quercetin and isoquercetin have all been reported. 2-6 dihydroxyacetophenone, 2-O-D-glucopyranoside, echioidinin,

pinostrobin, dihydroechioidinin, tectochrysin- 5-glucoside, methyl salicylate glucoside, and pinostrobin are a few of the other phytochemicals that are abundant in T. procumbens. Skullcapflavone-2-methylether, 5,7,8-trimethoxyflavone, androechin, 5,7,2-trimethoxyflavone, echioidin, 5,7-dimethoxyflavone and andrographidine.[20-21]

Flavonoids:

- Twenty-three flavonoids have been found to be present in T. procumbens, with a total content of about 65 g/kg, according to a recent study. Around 17.59% and 26.3%, respectively, are made up of kaempferol, catechin, and its derivatives (-)-epicatechin, (+)-catechin, (-)-eigallocatechin, (+)-gallocatechin, (-)-epigallocatechin-3-gallate (EGCE) and (-)-epigallocatechin-3-gallate. Biochanin, apigenin, naringenin, daidzein, quercetin, butein, robinetin, baicalein, nobiletin, genistin, ellagic acid, luteolin, myricetin, baicalin, isorhamnetin and silymarin make up the remaining 56.1%of the flavonoids.[22]
- The flavonoids found in T. procumbens are well known for mediating pharmacological properties such as free radical scavenging, anti-inflammatory, anti-allergic, anti-platelet aggregation, antimicrobial, anti-ulcer, antiviral, anticancer and antihepatotoxicity.[23]
- The entire plant was used to identify two new flavones, 8,3-dihydroxy-3,7,4-trimethoxy-6-O-Dglucopyranosylflavone and 6,8,3-trihydroxy-3,7,4-trimethoxyflavone as well as four previously identified compounds having antioxidant activity, puerarin, esculetin, oleanolic acid, and betulinic acid.[24]

Tannin:

- Tannin are water soluble polyphenols that are present in plants naturally. Tannin possess antimicrobial, anticarcinogenic and antimutagenic qualities, which may be related to their antioxidant capacities.[25]
- Several research have described the presence of tannin in T. procumbens.[26-27]
- Acetone water or chloroform water showed the presence of tannin in leaf extracts of T. procumbens.[28]
- T. procumbens buds and pedicle both contain tannin.[29]

- Carotenoids are fat soluble pigments found in the leaves that have three main functions in a plant: light harvesting, protection form photooxidative damage, and pigmentation to attract insects. Carotenoids have been postulated to prevent damage to DNA by oxidative stress.[30-31]
- Alkaloid - In a phytochemical screening analysis, using aqueous extraction of the leaves, thirty-nine alkaloids were present, mainly Akuamidine (73.91%) and voacangine (22.33%).[29]

1.1.5 Mechanism of action of various phytochemicals:[9]

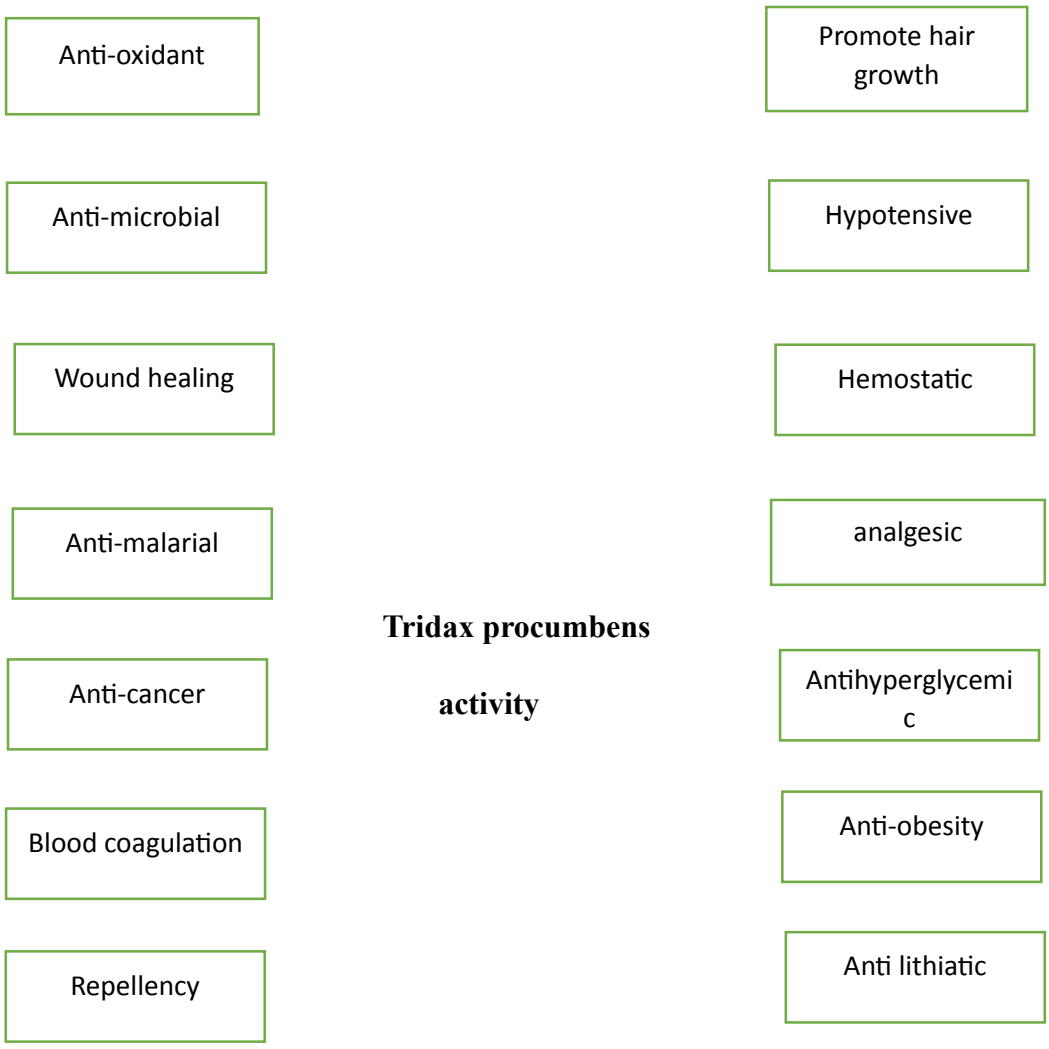
Phytochemical	Activity	Mechanism of action
Flavonoids	Anti-microbial activity	Complex with cell wall, binds to adhesins
Tannin		Binds to adhesins, enzyme inhibition, substrate deprivation, complex with cell wall, membrane disruption
Alkaloids		Intercalates into cell wall and DNA of parasites
Terpenoids		Membrane disruption
Quinones		Binds to adhesins, complex with cell wall, inactivates enzyme

table 2 Mechanism of action of phytochemical

1.1.6 Pharmacological activities:

- Tridax procumbens has a wide range of potential medicinal properties, including antimicrobial, antioxidant, antibiotic, wound healing, insecticidal and anti-inflammatory properties as well as the ability to treat diarrhoea and dysentery. Leaf juice is applied to new wounds to heal them. Help treat hair problem and shop bleeding. Tridax procumbens is mostly used in India as an anticoagulant, antifungal, and insect repellant for the treatment of wounds. Leaf extracts were used in traditional medicine to treat infectious skin conditions. Along with treating gastritis and heartburn, it is a well-known medication for liver problems or for its hepatoprotective properties. Using Tridax procumbens as a bio absorbent, hazardous Cr(VI) is removed from industrial effluent.[32]

- Tridax procumbens have shown many activities:[15]



[Fig 7 Tridax procumbens

Antimicrobial activity:

- It has been discovered that ethyl alcohol extracted Tridax procumbens leaf works best as an antibacterial agent against pseudomonas vulgaris. The ethanolic extract had excellent results. Antimicrobial action against non-fermenting, gram-negative, drug-resistant bacteria due to the presence of phytoconstituents such as flavonoids and tannins, pseudomonas isolated from nosocomial infections may have various different modes of action, including the inhibition of DNA gyrase, the suppression of cytoplasmic membrane function and the inhibition of energy metabolism.[33]
- The secondary metabolites have excellent therapeutic potential and fewer negative effects than synthetic antibacterial medicines, which are common. [34]

Anti-bacterial activity:

- The complete plant parts of Tridax procumbens have been found to exhibit antimicrobial action against diverse bacterial species in a previous research investigation. To extract juice that is administered twice daily for 4-5 days to treat cuts and wounds, an entire plant is squeezed between the palms of hands. Only pseudomonas was resistant to the antimicrobial effects of plant's whole extract. using the disc diffusion assay, aeruginosa. Two bacterial strains used in the test were gram positive is bacillus subtilis and gram-negative bacteria is Escherichia coli.[35]

Anti-fungal activity:

- To assess the antifungal activity of the plant decoction, the disc diffusion method was applied to two fungus strains, Aspergillus Niger and candida albicans. Minimum inhibitory and minimum fungicidal concentrations were used to measure total activity. Alkaloids decoction had no effect on either of the test fungus, while flavonoids decoction had the maximum efficacy against Aspergillus niger. [36]

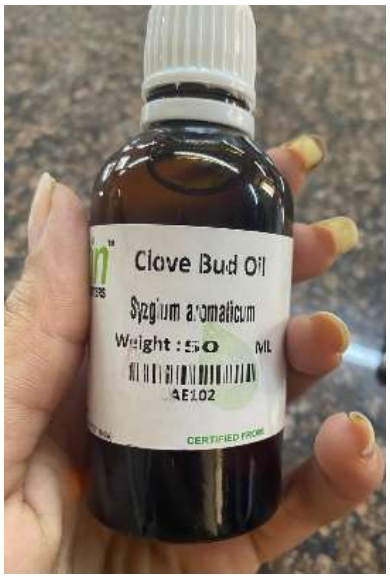
1.1.7 Traditional use:

- Tridax procumbens is a common weed and a blooming plant with a number of therapeutic benefits. It has historically been utilized in India as a wound healing agent, anti-coagulant and anti-microbial. Boils and blisters can also be treated with it. This healing herb is frequently employed as a folk remedy for conditions including ulcers and hair loss. Its leaf decoctions had a reputation for ethnic medications are used to treat infection skin problems. Because the plant decoctions have a hepatoprotective effect, it is a well-known ayurvedic remedy for liver problems. In addition, the extracts are utilized to treat gastritis and heartburn.
- It is frequently used to wounds to reduce haemorrhage caused by cuts bruises, and wounds. The herb is also used to treat severe diarrhoea and dysentery, as well as excessive blood pressure and blood sugar levels.
- It can be used to stop hair from falling out and it encourages hair growth. The herb is also used to treat respiratory conditions. It possesses strong anti-insect and immune-modulating properties.
- Rural medical professionals and indigenous peoples in west Africa and the tropical region of the world utilize the plant's leaves as a treatment for conjunctivitis.

- Moreover, this medicinal plant was employed in the ethnic medical system to treat liver problems and jaundice.
- Ethanol decoctions of Tridax procumbens were also used for curing kidney stone diseases.

1.2 Clove oil :

Clove is mainly used in Ayurvedics. It is usually known as “lavang”. Clove is mainly used in Ayurvedics. It is usually known as “lavang”. Clove (Syzygium aromaticum) a precious spice, it is a member of Myrtaceae. Clove is mainly used for preparation of food. Clove oil is used for antimicrobial, antiviral, anti-inflammatory, anti-diabeties and antioxidant properties Clove is mainly used for preparation of food. Clove oil is used for antimicrobial, antiviral, anti-inflammatory, anti-diabeties and antioxidant properties.[37]



[Fig 8. Clove oil]

2.1.1 Taxonomic classification:[38] *[table 3 Taxonomic classification of clove]*

Kingdom	*Plantae* - Plants
Subkingdom	*Tracheobionta* - Vascular plants
Superdivision	*Spermatophyta* - Seed plants
Division	*Magnoliophyta* - Flowering plants
Class	*Magnoliopsida* - Dicotyledons
Subclass	*Rosidae*
Order	*Myrtales*
Family	*Myrtaceae* Juss. - Myrtle familyP
Genus	*Syzygium* P. Br. ex Gaertn. - syzygiumP
Species	*Syzygium aromaticum*

1.2.2 Vernacular names of clove :[39] *[table 4 Vernacular names of clove]*

Languages	**Names used**
Bengali	Lavanga
Gujarati	Lavang
Hindi	Laung, Laumg, Lavang
Kannada	Lavanga, Karambu, Daevakusuma
Malayalam	Grampu, Karampu, Karayampu
Marathi	Luvang
Oriya	Labanga
Punjabi	Laung
Sanskrit	Bhadrasriya, Lavanga, Varala, Haricandana, Devakusuma
Tamil	Kirampu, Kiraambu, Grambu
Telugu	Devakusumamu, Lavangamu, Lavangalu
Urdu	Laung, Loung

1.2.3 Chemical Constituents of clove oil :[40] *[table 5 chemical constituents of Syzgium aromaticum]*

No.	Eugenol	β-Caryophyllene	α-Humulene	Eugenyl acetate
1.	87[a]	3.56[a]	0.40[a]	8.01[a]
2.	49.71[b]	18.94[b]	-	-
3.	72.4[b]	12.61[b]	1.56[b]	9.59[b]
4.	47.6[b]	35.4[b]	-	13.4[b]
5.	89.2	-	-	8.6
6.	27.1	8.7	1.1	-
7.	76.8	17.4	2.1	1.2
8.	81.13[a]	3.45[a]	0.38[a]	11.60[a]
9.	66.37[a]	15.38[a]	1.97[a]	12.99[a]
10.	72.34[a]	12.51[a]	2.34[a]	5.34[a]

1.2.4 Pharmacological activity of Clove oil:

1.2.4.1Antibacterial activity :

Numerous investigations have proven clove's strong antibacterial properties. cloves contain a number of components that contribute to their inhibitory action, primarily eugenol, eugenyl acetate, and β~caryophyllene, 2-heptanone, methyl salicylate, α-humulene, acetyl-eugenol, iso-eugenol, methyl-eugenol, and phenyl propanoides, dehydrodieugenol, trans-confireryl aldehyde, biflorin, kaempferol, rhamnetin, myricetin, gallic acid, ellagic acid and oleanolic acid .

Similarly, clove oil was shown to be effective against gram negative bacteria (Y. enterocolitica, S. choleraesuis, P. aerugenosa), as well as gram positive bacteria (S. aureus, B. cereus, E. faecalis, and L. monocytogenes) that are carried by food.[41]

1.2.4.2Antifungal activity :

Clove oil and eugenol have been shown in numerous studies to exhibit antifungal activity against filamentous fungi and yeasts, including several foodborne fungal species and human pathogenic fungi. In animal models, eugenol and clove oil have also been investigated as antifungal agents. Carvacrol and eugenol, two of clove's phenolic components, are known to have fungicidal properties, including the ability to combat fungi isolated from onychomycosis because the spores and micelles were lysed, chromatographic examination revealed that eugenol was the primary component responsible for the antifungal activity. Another study described a comparable mode of action for the disruption and distortion of macromolecules caused by eugenol.

Clove oil and eugenol were found to have a wide range of fungicidal activity against Candida, Aspergillus, and dermatophytes. The mechanism of action was linked to cytoplasmic membrane lesions.
Their hydrophobicity, which causes them to partition into the lipid bilayer of the cell membrane and change permeability, thereby contributing to the activity by allowing cell contents to seep out**.** [41]

1.2.5 Traditional use of Clove oil :

Cloves can be used in cooking and medicine, among other applications. A useful culinary spice, cloves can be used to salad dressings, herbal teas, soups, onions, and tomatoes. In addition, meat products, biscuits, chewing gum, pickles, spicy fruits, chocolates, soft drinks, puddings, sandwiches, pastries, and sweets are all flavored with it. To add essence to toothpaste, soaps, fragrances, and medications, volatile oil is employed. In Indonesia, a unique type of cigarette known as "Kretek" is made by combining tobacco and cloves in a 1:2 ratio.
With its ability to combat bacteria, clove is a common ingredient in mouthwashes, dental creams, throat sprays, and tooth pastes. Moreover, it relieves painful gums. Dental cavities are temporarily filled with a mixture of zinc oxide and eugenol, the principal bioactive component of cloves. Flavonoids are the reason clove oil has anti-inflammatory qualities. For the aromatherapy of rheumatism and arthritis, pure clove oil is employed. Skin disorders can be treated using a paste made of clove powder and honey. Bite and cut healing is accelerated by using a paste made of water and clove powder. Many digestive issues, such as dyspepsia, nausea, flatulence, and loose motion, can be treated with cloves. Clove oil strengthens the body's defenses against invasive microorgani[42]

1.3 Neem seed oil:

- The versatile medicinal plant neem (Azadirachta indica) is the source of a number of chemical structures and biological effects. Many studies have already been conducted in the past to comprehend the chemistry and therapeutic applications of various components of neem for industrial and therapeutic usage. The plant Azadirachta indica is now a source of numerous medicinal compounds utilized in conventional medicine[43-44]
- The neem seed oil is obtained from the seed kernels of the neem tree and the process of obtaining it is fairly simple process[45]

[Fig. 9 Neem seed]

1.3.1 Taxonomic classification:[46]

- Order: Rutales
- Suborder: Rutinae
- Family: Meliaceae
- Subfamily: Melioidene
- Tribe: Melieae
- Genus: Azadirachta
- Species: Indica

1.3.2 Chemical Constituents: *[Table 6 chemical constituent of Neem seed oil]*

- More than 135 compound have been isolated from neem.[47]Following constituents shown in neem seed oil[48]

Sr no.	Compound Name	Biological activity
1	Nimbidin	Anti-inflammatory, Antiarrhritie, Antipuretic, Antibacterial, Antifungal, Spermicidal
2	Sodium nimbidate	Anti-inflammatory
3	Azadirachtin	Antimalarial
4	Nimbin	Spermicidal
5	Nimbolide	Antimalarial, Antibacterial
6	Gedunin	Antimalarial, Antibacterial
7	Mahmoodin	Antibacterial

2.LITARATURE REVIEW OF DISEASE DUE TO BACTERIA :

2.1 E.coli :

Escherichia coli is one of the most important agents of extraintestinal infections, with the potential to cause infection in almost any anatomical site. It can be grouped into pathotypes,

such as uropathogenic *E. coli* (UPEC), septicemia-associated *E. coli* (SePEC), skin and soft tissue infection (SSTI)-associated *E. coli*, neonatal-meningitis-causing *E. coli* (NMEC). Skin and soft tissue infections (SSTIs) are major bacterial infections, often self-limiting but in severe cases requiring hospitalization and parenteral antibiotic therapy. [47]

2.2 Staphylococcus aureus :

Staphylococcus aureus is the most common pathogen involved in skin infections worldwide, regardless of the patient's age, the climate or geographical area. Localized *S. aureus* skin infections are either primary or secondary. A primary or "spontaneous" cutaneous infection is an infection occurring without preceding clinically evident lesions or secondary to a minimal skin lesion. These infections include impetigo, folliculitis, furuncles, and primary abscesses. Secondary skin infections are those occurring as a consequence of a pre-existing cutaneous lesion (usually incorrectly called "superinfections"). *Staphylococcus aureus* infections of the skin to consider this rich and varied clinical spectrum.[48]

2.3 Bacillus subtitis :

A common Gram-positive aerobic environmental bacterium is Bacillus cereus. Cutaneous B. cereus skin infections are often associated with drug-induced neutropenia, haematological malignancies, and open wounds. The pathogen may enter non-traumatic instances through small skin abrasions on the hands and/or feet. Numerous kinds of soils, sediments, dust, and plants all contain B. cereus. This is important because it may be accessed by small cuts on the skin. [49]

2.3 P.vulgaris :

A class of uncommon autoimmune bullous disorders affecting mucous membranes and the skin is known as phenophigus diseases. The goals of topical therapy for PV lesions are to lessen discomfort and stop subsequent infections. Usually, creams containing corticosteroids and/or antibiotics are used. Tacrolimus use has been documented, especially in relation to face lesions. Antiseptic solutions like chlorhexidine or potassium permanganate (1:10,000 or 1:20,000) may be used in really severe instances. For the oral mucosa, stronger gel corticosteroids such clobetasol dipropionate may be used. For recalcitrant skin lesions (such pemphigus vegetans), intralesional injections of triamcinolone acetonide (10 mg/mL) may be utilized.[50]

Material Use in Formulation :

Equipment: Measuring cylinder, Beaker, Stirrer, Thermometer, white porcelain dish, water bath, weighing balance, pipette, mortar pestle,

Collection of material:

Tridax procumbens collected from the garden. Neem seed oil and gel base materials are used form laboratory ingredient.

Ingredients:[51] *[Table 7 Ingredients]*

Ingredients	Uses
Carbopol 940	Viscosity enhancer, gelling agent
Propylene glycol	Humectant
Methyl paraben	Preservative
Propyl paraben	Prevent growth of micro-organism
Glycerin	Natural Humectant, Softening agent
Tridax procumbens	Anti-microbial
Clove oil	Anti-bacterial, Anti-fungal
Neem seed oil	Anti-bacterial, Anti-fungal
Tween 80	Emulsifier
Triethanolamine	Thickening agent, maintain ph
Distilled water	Water base

[Fig. 10 material use in Formulation]

Extraction process:

entire plant is collected and remove foreign matter

↓

plant part is washed with distilled water and dried in shade for seven days

↓

after complete drying of leaves than form a coarse powder in mortar pestle

↓

powder is collected in beaker

↓

add 70% methanol and soak for 24 hours

↓

then filter the extract and collect filtrate

↓

filtrate is evaporated in water bath for evaporation of ethanol and collect sticky extract for preparation of gel.

Agar cup method :

Preparation of agar:

- Nutrient broth was mixed in 150 ml of water.
- Agar was added in nutrient broth and heat until solution become transparent with constant stirring.
- Media was autoclave for 15 mins.

Preparation of agar plat:

- Arrange the pertidish on level surface.
- Sterilize the neck of the flask on a flame and pour 15-20 ml of medium into each dish and stand until media become solidified.
- Add bacterial culture media (E. coli, S. aureus, B. subtitis , p.vulgaris) with micropipette and spread over the plat.
- Then boring on agar media and filling the sample.
- Then plat put in incubator for 24 hrs.
- After 24 hr., the plat was observed and measure zone of inhibition.

Methodology:

Weight accurate Carbopol 940 and take ¾ quantity of water in beaker Place beaker over night , to soak the Carbopol 940 in water

↓

Add this Carbopol 940 and water mixture into mortal pestle , slowly add one by one all aqueous soluble component with constant trituration

↓

Add glycerin, Methyl paraben , propyl paraben ,Propylene glycol and Tridux procumbens extract one by one

↓

Then add Tween 80 drop by drop

↓

Then slowly add Neem seed oil and clove oil with constant trituration

↓

Add one to Two drops of Triethanolamine

[Fig.20 Emulsifying g

Formulation of Emulsifying gel : *[Table 8 Formulation]*

Ingredient	F1	F2
Carbopol 940	0.2 gm	0.2 gm
Propylene glycol	2 ml	2 ml
Methyl paraben	0.04 ml	0.04 ml
Propyl paraben	0.02 ml	0.02 ml
Glycerin	0.2 ml	0.2 ml
Tridax procumbens	10 ml	10 ml
Clove oil	1 ml	1 ml
Neem seed oil	1-2 drops	1-2 drops
Tween 80	1-2 drops	1-2 drops
NaOH	-	1-2 drops
Triethanolamine	Quantity sufficient	-
Distilled water	20 ml	20 ml

Here, we prepared two different formulation using different proportion of ingredient ,and we find out that **F2** have good result compare to **F1**.

Ingredients	Final batch
Carbopol 940	1 gm
Propylene glycol	10 ml
Methyl paraben	0.04 ml
Propyl paraben	0.02 ml
Glycerin	1 ml
Tridax procumbens	10 ml
Clove oil	5 ml
Neem seed oil	1 ml
Tween 80	Few drops
Triethanolamine	Q.S
Distilled water	100 ml

Evaluation parameter :

1.Physical appearance:

Color is important for patient compliance. The prepared gels were inspected visually for clarity, colour, order and texture etc.

2. pH:

The pH of gel was determined using digital pH meter, 2 gm herbal gel was stirred in distilled water till uniform suspension is formed. The volume was made up to 40 ml and pH of the solution was measured.[52]

3. skin irritation:

Mark the area on hand surface. Then gel was applied to the area and time was noted. Then its is checked for irritancy, erythema, edema checked for on interval of 24 hrs.[53]

4. spreadability:

The spreadability of the gel formulations was determined by measuring the spreading diameter of 1 g of gel between two horizontal plates after one min. The standard weight applied on the upper plate was 125 gm.[54]

5. Antibacterial activity:

Preparation of agar:

- Nutrient broth was mixed in 150 ml of water.
- Agar was added in nutrient broth and heat until solution become transparent with constant stirring.
- Media was autoclave for 15 mins.

Preparation of agar plat:

- Arrange the pertidish on level surface.
- Sterilize the neck of the flask on a flame and pour 15-20 ml of medium into each dish and stand until media become solidified.
- Add bacterial culture media (E. coli, S. aureus, B. subtitis , p.vulgaris) with micropipette and spread over the plat.
- Then boring on agar media and filling the sample.
- Then plat put in incubator for 24 hrs.
- After 24 hr., the plat was observed and measure zone of inhibition.

Result and discussion of prepared Emulsifying Gel :

1.physical appearance: *[Table 9 Physical appearance]*

parameter	**F1**	**F 2**
colour	White	White
odour	Characteristic	Characteristic
clarity	Yes	Yes
Texture	Smooth	Smooth
State	Semisolid	Semisolid

2. pH: *[Table 10 pH]*

The pH of the gel has been mostly found between 6 to 8

Sr no.	**Formulation**	**pH**
1.	F1	6.8
2.	F2	6.5

3. Skin irritancy: *[table 11 skin irritancy]*

The gel has been not shown redness of skin, erythema, edema, irritancy during the study. The gel has been safe.

Sr no.	formulation	Irritancy	Erythema	Edema
1.	F1	No	No	No
2.	F2	No	No	No

4. spreadability: *[Table 12 Spreadability]*

Sr no.	Formulation	Evaluation
1.	F1	55 mm
2.	F	60 mm

[Fig.21 spreadability]

5. Result of plant extraction :

[Fig. 11Filteration]

[Fig.12 Evaporation]

6. Result of antibacterial activity of plant extract & oils on bacteria : : *[Table 13 Antibacterial activity]*

Bacteria	Std.(mm ± SD)	Clove oil(mm ± SD)	Neem seed oil	1000µg/ml (TP)
B. subtitis	15.66 ± 0.57	10.33 ± 0.57	-	-
S. aureus	15.66 ± 0.57	12 ± 0.86	-	-
E. coli	15.66 ± 0.57	10 ± 0	-	-
P. Vulgaris	12.33 ± 0.57	10 ± 0	-	-

[Fig. 12 Antibacterial activity of plant on p.valgarin]

[Fig. 13 Antibacterial activity of plant on B.subtitis]

[Fig. 14 Antibacterial activity of plant on E.coli]

[Fig. 15 Antibacterial activity of plant on S.aureus]

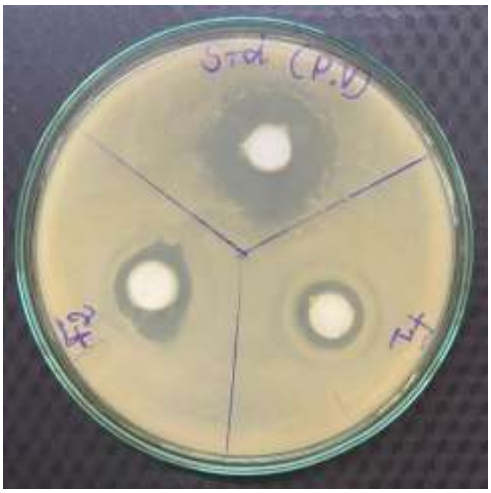
7. Result of Antibacterial activity of F1 & F2 on bacteria : *[Table 14 Antibacterial activity]*

Species	**F1** .(mm ± SD)	**F2**.(mm ± SD)	**Standard** .(mm ± SD)
B. subtitis	14.66 ± 0.76	14 ± 1	25.83 ± 0.7
S. aureus	14.66 ± 0.76	30.16 ± 0.2	32.83 ± 0.7
E. coli	14.66 ± 0.76	20.33 ± 0.5	31.33 ± 0.5
P. Vulgaris	13.83 ± 0.76	17.83 ± 0.7	29 ± 1

[Fig.22 Antibacterial activity of formulation onB.Subtitis]]

[Fig.23 Antibacterial activity of formulation on S.aureus]

[Fig. 24 Antibacterial activity of formulation on E.coli]



[Fig.25 Antibacterial activity of formulation on p.vulgaris

Here ,F2 give more Antibacterial activity compare to F1 .Maximum activity is against s.aureus**.**

Conclusion:

From the present investigation, it has been revealed that herbal emulsifying gels of plant *Tridax procumbens*, Clove oil and neem seed oil can be formulated using Carbopol 940 as polymer with other ingredients and the evaluation of physical parameters shown satisfactory results. From the antibacterial activity it was found that prepared herbal Emulsifying gel have good antibacterial activity ,it may be use to prevent bacterial infection. we can also go for fungal studies if we getting good result then we can also use it for antifungal activity . It should beneficial to the society for several bacterial and fungal infection.

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Skill Training Report

S.B.DOSHI MEDICAL CENTER

Submitted by

Miss Vincy J. Parmar

PG-DMLT, Sem II

To

Department of Microbiology
Faculty of Science

Atmiya University

Yogidham Gurukul, Rajkot

Atmiya University

Faculty of Science

Department of Microbiology

POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

AU/PGDMLT/2021-22 **Exam Seat No. 210661082**

CERTIFICATE

This is to certify that Skill Training has been successfully completed at **S.B.DOSHI MEDICAL CENTER** by **VINCY J. PARMAR,** students of Postgraduate Diploma in Medical Laboratory Technology, Department of Microbiology, Faculty of Science, Atmiya University, Rajkot as a part of the partial fulfillment for the PG-DMLT during academic year 2021-22.

Dr. Shivani Patel
Head,
Dept. of Microbiology
Atmiya University

Head of Department
Department of Microbiology
Faculty of Science
Atmiya University
Rajkot

Dr. Minaxi Parmar
Assistant Professor
Dept. of Microbiology
Atmiya University

Examiner's Signature:

Date: 04/06/2022

ACKNOWLEDGEMENTS

Atmiya University , who made my transition from A student life to professional life a remarkable one. To all the other trainees who were with me during training period, I would also thank them. Because of them I could have an overview of the work that was going on in their respective We take this opportunity to thank everyone, who made my training possible. All the people that We have worked with, have contributed to our learning process during all these months We aer highly indebted to all the people who have spared their valuable time for my training and help me develop my insight for all the techniques.

During the stay at laboratory superiors and colleagues have helped me grow intellectually as well as professionally and also provided a congenial environment to work with. It has been a great gusto to have known and worked with the team.

S.B.DOSHI MEDICAL CENTER LABORATORY On the first place I would like to record my gratitude to Dr. KAPIL M. RATHOD - my training guide under whose supervision, guidance and advice I have completed my training in a successful way. He showed interest to teach me and enriched my growth in this field.

They have trained me in all the possible techniques, enduring my frequent queries by giving prompt replies to my uncertainties in the technique I thank the HR department of lab.

We Have also indebted to **Dr . Minaxi Parmar** More for all the effort that My heartfelt thanks to Department, thus broadening my knowledge.

INDEX

INTRODUCTION TO LABORATORY

- Laboratory is a place that is equipped with different instruments, equipments and chemicals etc. for performing experimental works, research activities and investigate procedures
- Madical laboratory is one part of laboratory.
- Different department in This laboratory blood collection , urine collection, case counter special arrangement of chairs for patients .rest room of patients for any adverse effect. Instrument department or computer department is available.
- In this laboratory, all instrument is available and every month cheak the instrument to proper work or not. All type of testing is available and testing type of reagent kit is avaible.and test is perform in sutaible temperature. all kind of cell seeing in microscopic area, and perfect result and perfect testing is performed. provide all typel facility to the patients.

DEPARTMENS OF LABORATERY

- A medical laboratory or clinical laboratory is a laboratory where clinical pathology tests are carried out on clinical specimens to obtain information about the health of a patient to aid in diagnosis, treatment and prevention of disease.
- In **S.B.DOSHI MEDICAL CENTER** there are laboratory in pathology department.

- Blood collection
- Hematology laboratory
- Clinical biochemistry laboratory
- Serology & immunology
- Coagulation testing
- Urine analysis
- Parasitology

BLOOD COLLECTION

Procedure of blood collection:-

There are three popular methods of blood collection.

- Arterial sampling
- Venipuncture sampling
- Fingrestick sampling

BLOOD COLLECTION: COLOURCODE TUBES

- Red-top tubes contain no additives. These tubes are used for test performed on serum sample and DNA.
- When you used the red-top tubes, the sample can be placed for 1-2 hrs. so that the serum and blood clots will be separated. Blood clots can be used for DNA analysis.
- Lavender-top tubes contain EDTA, commonly used clinically for complete blood cell counts.
- This is the way to obtain lymphocytes for DNA extraction, plasma for nutritional analysis, and red blood cells for other assays.
- EDTA is an anticoagulant. It works by calcium chelation and is used clinically and hematology studies. It is well suited to DNA based assays.
- Green-top tubes contains heparin. Heparin is a natural coagulant used in some test.
- Blue-top tubes contain sodium citrate and citric acid. Citrate also works by calcium chelation and in used in coagulation studies and blood banking.
- Black-top tubes contains sodium oxalate.
- Yellow-top tubes contains acid-citrate-dextrose (ACD) solution.
- Gray-top tubes contains a glycolytic inhibitor.

HEMATOLOGY DEPARTMENT

- A Hematology is a test that measure the proportion of the person's blood that is made up of Red Blood Cells Blood consists of RBCs, WBCs and platelets suspended in a fluid protein called Plasma. The hematocrit is a ratio of the volume of red blood cell to the volume of all these components together, called whole blood. The volume is expressed as a percentage of fraction

➢ CELL BLOOD COUNTER:

In CBC Counter, All blood cell count Like, Hb counter,platlet counter , WBC, RBC,HCT,MCV,MCHC etc..

- SYSMEX XP-100

TEST:

- CBC
- HB
- TC, DC
- BTCT
- ESR
- Platelet

CLINICAL BIOCHEMISTRY

• This area typically includes automated analysis of blood specimens, including test related to enzymology, toxicology, endocrinology.

□ In the clinical biochemistry lab most of the test performed from the serum. There are many clinical biochemistry test mentioned below :

❖ **TEST :**

- RBS
- FBS
- PPBS
- Blood Urea
- S. Creatinine
- NA+
- K+
- CL-
- Ca++
- Bicarbonate
- Bilirubin
- SGPT
- SGOT
- S. Protein
- Total Protein
- S. Phosphorus

SEROLOGY & IMMUNOLOGY

- Determine blood group ,this area determines a patients blood type and Rh status.all blood serum test is avaible like creatinie,SGPT,SGOT, Urea ,uric acis ,serum albumin,Lipid profile FBF ,PPBS, direct or indirected bilirubin and any more test is avaible.In serology HIV, IgM Antibody, CRP,dengue ,HBSAG, VDRL,WIDAL,pragnency,TB any etc.. testing is included test

COAGULATION TESTING

- In coagulation testing includes determines various blood clotting times, coagulation factors and platelet function. PT ,APTT Testing.

URIBEANALYSIS

- Test urine for many analysis including microscopically.
- If more percise qualification of urine chemicals is requird the specimen is processed in the clinical biochemistry lab .

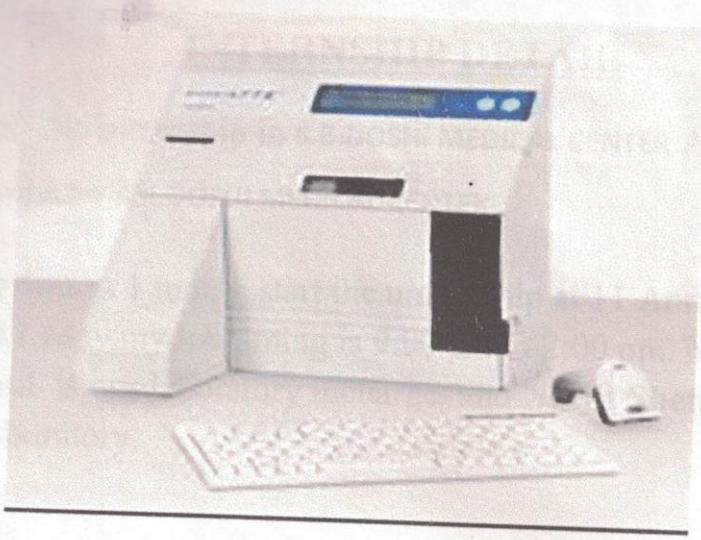
PARASITOLOGY

- Is where specimens are examined for parasites. For example stool samples may be examined for evidence of intestinal parasites such as tapeworms or hookworms.

INSTRUMENT : FINE CARE

TEST:

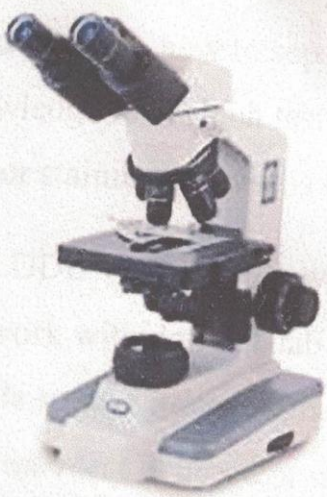
- HBA1C
- TSH
- PSA
- TR10-I
- D-D
- PCT



INSTRUMENT : SMARTLYTE

TEST :

- **Na+**
- **K+**
- **Cl**



INSTRUMENT : MICROSCOPE

INTERNSHIP DETAIL

- I have complet The internship in **S.B.DOSHI MEDICAL CENTER**.And this laboratory is runs by **S.B.DOSHI MEDICAL CENTER**
- My internship time is 1 month.start the unternship at 11 April and completed at 11 May.my lab timing is 9:00 am to 2:00 pm. **Miss Kalpana Udani** is our laboratory incharge and **Nishit Sheth** is co-ordinator of laboratory.

SUMMARE

- We know that time is very precious andas time is changing everything changes to cope with new things. During this time I got an apportunity of getting practical knowledge about the laboratory system.
- In this laboratory introduction of may instrument , all type of reagent kit, and how to perform in blood .urine test, and getting knowledge for how to operate instrument.
- During this time,We have done our many test like Biochemistry test, blood test .serology test and many other test introduction for blood collection in patients. how to separate serum or plasma in to blood and getting knowledge for which test performed in serum or plasma. Smear preparation or staining process is done during this time.
- We CONCLUDE That , during work in this laboratory we experience that how to work with doctors, lab technicians and staff. Also learned that how to operate some automated machines, how to work with this machine how to performed test in blood or urine .and how to communication with patient.
- We have wonder full experience to work in this laboratory.

LEARNING OUTCOME

- We complete the internship and get use full knowledge for how to work in laboratory. how to perform test from blood or urine.
- Developed communication skill, how to communication to patient.
- Getting correct information about instrument.
- Getting knowledge for how to operate for some automated machines, and how to work with this machine
- Introduction of many test like urine analysis, sputum analysis, stool analysis, and other all blood test.
- We getting knowledge for how can we run the laboratory when we are alone.

શ્રી વર્ધમાન ચેરિટેબલ ટ્રસ્ટ - સંચાલિત

એસ. બી. દોશી મેડીકલ સેન્ટર

'[illegible]-પ્રેમ-ધીર-સંકુલ' શ્રીજા માળે, ૫ વૈશાલીનગર, રૈયા રોડ, સીટી સેન્ટર / વેસ્ટ સાઈડ શો-રૂમની સામે, રાજકોટ-૩૬૦૦૦૭.

Date :-11/04/2022

Certificate for internship

TO WHOM IT MAY CONCERN

This is certify that **Miss.Parmar Vincy** student of Atmiya university in rajkot has completed her internship in our Pathology Department under the guidance of Miss.**kalpna udani** – Assistant Manager. The periode of training was from 11st April,2022 to 11stMay,2022.

During her internship period we found her to be sincere and hardworking and dedicated student with professional attitude to learn new things. She is good in nature and character is well. Her performance expectations and was able to complete the internship successfully on time.

We wish all the best for her future endeavors.

For,

SHREE VARDHMAN CHARETABAL TRUST

S.B.DOSHI MEDICAL CENTER

RAJKOT 360007

Warm regards,
Lab incharge

MISS KALPNA UDANI

શ્રી વર્ધમાન ચેરિટેબલ ટ્રસ્ટ
એસ.બી. દોશી મેડીકલ
& વૈશાલ્ય સેન્ટર
શ્રીજા માળ, શ્રી જશ-પ્રેમ-ધીર સંકુલ,
૫ વૈશાલી-નગર, રૈયા રોડ,
સીટી સેન્ટર / વેસ્ટ સાઈડની સામે,
રાજકોટ - ૩૬૦ ૦૦૭ મો. :- ૯૬૪૪૧ ૦૮૦૧૯

S.B DOSHI MEDICAL CENTER
Dr. Kapil Rathod
M.D. Medicine
G-30391
RAJKOT

DR.KAPIL M.RATHOD
(CONSULTANT PHYSICIAN)

A Dissertation thesis entitled

"SYNTHESIS, CHARACTRIZATION AND PHYSICO-CHEMICAL PARAMETERS STUDIES OF BENZODIAZEPINE DERIVATIVE"

Submitted in partial fulfillment of the requirements

For the award of the degree of

Master of Science

IN

INDUSTRIAL CHEMISTRY

Submitted By

MR. YAGNIK P. SOLANKI [ENROLLMENT NO. 190722017]
MR. DHARMIK V. SUDANI [ENROLLMENT NO. 190722018]

Under the guidance of

ER. DHAVAL A. TANK
Assistant Professor
Faculty of Science
Department of Industrial Chemistry
Atmiya University, Rajkot.

FACULTY OF SCIENCE (FoS)
DEPARTMENT OF INDUSTRIAL CHEMISTRY
ATMIYA UNIVERSITY
RAJKOT-360 005, GUJARAT, INDIA.

2020-2021

Dedicated to

My Family & Department of Industrial Chemistry

Without their love, support and constant encouragement this would not have been possible.

ATMIYA UNIVERSITY

Yogidham Gurukul, Kalawad Road,
Rajkot - 360005, (Gujarat) INDIA

सुहृदं सर्वभूतानाम्

CERTIFICATE

This is to certify that the dissertation thesis entitled **"Synthesis, Characterization and Physico-Chemical Parameters Studies of Benzodiazepine Derivative"** submitted by **Mr. SOLANKI YAGNIK PARBATBHAI (Enroll. 190722017),** A Post Graduate student of Faculty of Science, Department of Industrial Chemistry, Semester-IV, Atmiya University, Rajkot, as a part of the degree of Master of Science (M.Sc.) in Industrial Chemistry during academic year 2020-2021.

D. A. Tank

.....

Er. Dhaval A. Tank
Guide
Faculty of Science
Department of Industrial Chemistry

.....

Er. Ravi S. Tank
Head
Faculty of Science
Department of Industrial Chemistry

Atmiya University Rajkot

.....

Dr. Ashish M. Kothari
Dy. Registrar

Date: 05.04.2021
Place: Rajkot

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Yogidham Gurukul, Kalawad Road,
Rajkot - 360005, (Gujarat) INDIA

CERTIFICATE

This is to certify that the dissertation thesis entitled **"Synthesis, Characterization and Physico-Chemical Parameters Studies of Benzodiazepine Derivative"** submitted by **Mr. SUDANI DHARMIK VITHTHALBHAI (Enroll. 190722018),** A Post Graduate student of Faculty of Science, Department of Industrial Chemistry, Semester-IV, Atmiya University, Rajkot, as a part of the degree of Master of Science (M.Sc.) in Industrial Chemistry during academic year 2020-2021.

D. A. Tank

.....

Er. Dhaval A. Tank
Guide
Faculty of Science
Department of Industrial Chemistry

.....

Er. Ravi S. Tank
Head
Faculty of Science
Department of Industrial Chemistry

Atmiya University Rajkot

.....

Dr. Ashish M. Kothari
Dy. Registrar

Date: 05.04.2021
Place: Rajkot

DECLARATION

We undersigned, hereby declare that the work assimilated in the dissertation thesis entitled **"Synthesis, Characterization and Physico-Chemical Parameters Studies of Benzodiazepine Derivatives"** has been carried out by us at Faculty of Science, Department of Industrial Chemistry, Atmiya University, Rajkot, Gujarat, India, under the supervision and Guidance of **Er. Dhaval A. Tank, Assistant Professor, Faculty of Science, Department of Industrial Chemistry, Atmiya University, Rajkot, Gujarat, India.**

To the best of our knowledge and belief, the work included in this thesis is quite original and has not submitted to any other Institution or University for the award of any degree either in this or any other form.

SOLANKI YAGNIK P. **ENROLLMENT NO. 190722017**

SUDANI DHARMIK V. **ENROLLMENT NO. 190722018**

We wish to express our sincere gratitude and honour to our Research supervisor **Er. Dhaval A. Tank, Assistant Professor, Faculty of Science, Department of Industrial Chemistry, Atmiya University, Rajkot,** for their inspiring, splendid and authentic guidance, moral support and constant encouragement throughout our research work. Their passion and dedication towards research has stimulated, provoked and facilitated us to complete this endeavour. We could not have imagined having a better Research Supervisor and mentor for our M. Sc study. Their role will always remain fundamental in shaping our future.

SOLANKI YAGNIK P. **ENROLLMENT NO. 190722017**

SUDANI DHARMIK V. **ENROLLMENT NO. 190722018**

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First and foremost, from the bottom of heart, body, mind and soul, praises and thanks to our parents, the god, an almighty, for his showers of blessings throughout this research work. We must pray in the lotus feet of **H.D.H. P.P. Hariprasad Swamiji Maharaj** for their divine blessings. We convey our heart full thanks to the **Faculty of Science, Department of Industrial Chemistry, Atmiya University, Rajkot,** for providing laboratory facilities for the course of this work.

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We warmly thank our research supervisor **Er. Dhaval A. Tank,** Assistant Professor, Department of Industrial Chemistry, Atmiya University, Rajkot for his splendid guidance, authentic supervision, moral support, constant encouragement and giving us an opportunity to work under him with compilation of magnificent experience.

We thank our Dissertation Review-I & II committee members, **Dr. Mehul L. Savaliya, Mr. Anand V. Khistariya,** and **Dr. Govind V. Vagadiya** of Department of Industrial Chemistry for their insightful comments, suggestions and unconditional help in our research work.

At last but not least, weare very much thankful to the all teaching & non-teaching staff members, **Mr. Vipul Meghnathi, Mr. Jigneshbhai Gohil, Mr. Sunilbhai Parmar** and co-researchers of Department of Industrial Chemistry for their helping hands.

CONTENTS

ABSTRACT:

Benzodiazepines are widely used drugs for several indications. This study provides, on the other hand, a global vision of the family starting for their fortuitous discovery, the synthesis of their derivatives, their mechanism of action widely known nowadays, the actual classification according to the chemical structure and pharmacokinetic properties, and their uses and indications, the traditional and the new ones. On the other hand, the study is focused in the mainly problems of benzodiazepines, dependence and tolerance, many times led by a misuse of the patient, wrong prescriptions, or extended treatments. A withdrawal program is proposed that includes the important factors or criteria to success, with a slow and gradual reduction of these drugs, avoiding relapse or severe adverse effects. New lines of research related to benzodiazepines are taken into account, which not only include the new therapeutic uses but also the adverse effects in short and long term.

BZDs have proven to be excellent drugs for the known pharmacological properties they present, as: Action-Clinical uses, Anxiolytic- Anxiety and panic/phobias, alcohol withdrawal, Hypnotic- Insomnia, Muscle relaxant- Muscle spasms, spasticity caused by CNS pathologies, Anticonvulsive- Attacks caused by drug intoxications, some forms of epilepsy, Amnesic- Intraoperatively or pre-surgery medication.

The variation of the dose changes the effects: a hypnotic BZD administered in low doses produces anxiety-relieving effects, whereas a BZD marketed as an antianxiety drug at higher doses induces sleep.

Adverse effects:

In general, BZD are well-tolerated drugs if the use and administration are correct. In most of the cases, adverse reactions are a prolongation of the pharmacological action that affects the CNS.

Frequent: somnolence (50% of the patients experienced it during the first days of treatment), sedation, ataxia (in the older times), fatigue, and anterograde amnesia (recent facts).

Occasionally: dizziness, headache, depression, confusion, and dysphasia.

Exceptionally: rush or urticaria, pruritus, and visual and/or audition alterations.

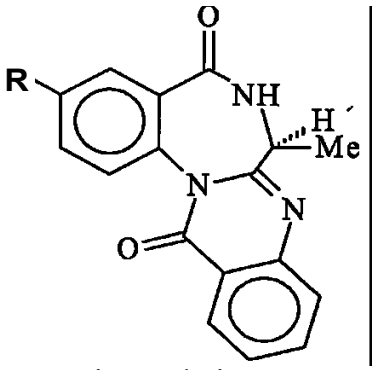
LITERATURE REVIEW:

Benzodiazepine structural motifs are found in numerous pharmaceutical agents with a wide range of biological applications and hence recently they have gained considerable attention by chemists.

Benzodiazepines are a class of compounds that have selective activity against a diverse array of biological targets. Their basic structure comprises a benzene ring fused to a seven-membered ring heterocycle, which contains two nitrogen atoms within the ring. The names of the benzodiazepines are derived from the location of the nitrogen atoms within the heterocycle ring.

Benzodiazepines (BZDs), as a class of antianxiety, hypnotic, d muscle relaxing agents, have replaced traditional barbiturates. Benzodiazepines are more effective in alleviating anxiety and stress and they have fewer and less severe side effects. Consequently, BZDs continue to be used to treat such conditions as phobic and panic disorders, as well as depression and migraines. In additions to trating anxiety, BZDs are often prescribed for treating insomnia, alcohol withdrawl and more recently, epilepsy.

I, 5-benzodiazepiiles are being investigated for their central nervous system depressant properties. Additionally, many benzodiazepine alkaloids found in nature, such as Circumdatin (1) and Circumdatin (2).

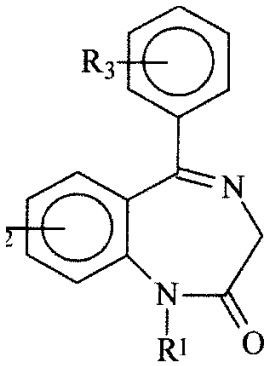


Circumdatin

1 =R=H

2=R=OH

As structural analogues of benzodiazepines derivatives (3) represent a significant class of neurologically active agents.

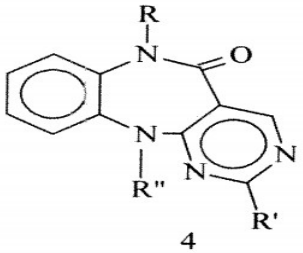


3

5H-pyrimido [4, 5-b]- [l,5]benzodiazepin-5-ones (4) and pyrazolo[3,4-b]-

[l, 5] benzodiazepin-4-ones (5 and 6) as well as tetracyclic derivatives 7 are reported as analogues of nevirapine and its very active tetracyclic derivatives, respectively.

Compounds 4, 5, 6 and 7 display effect against the HIV-I multiplication in acutelyinfected MT-4 cells and the HIV-I rRT in enzyme assays.



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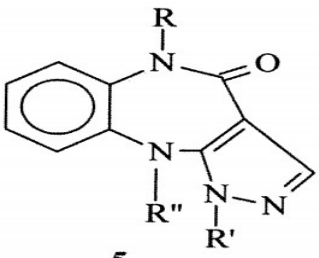

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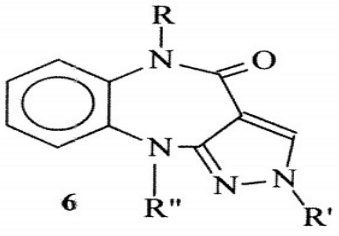

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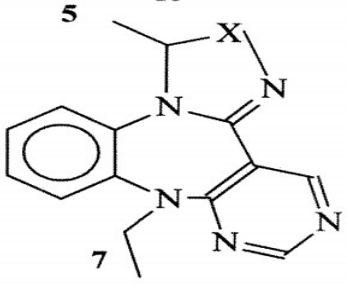
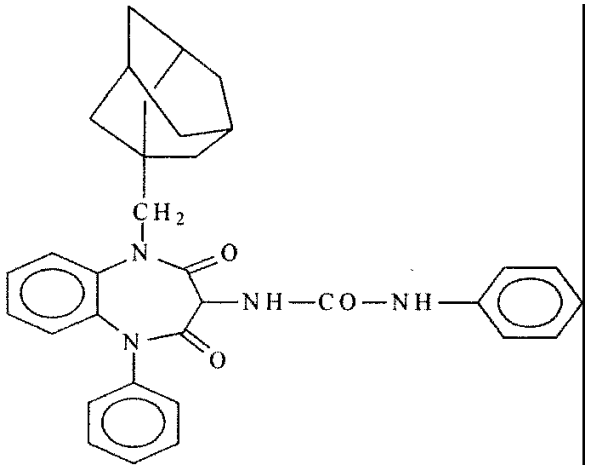


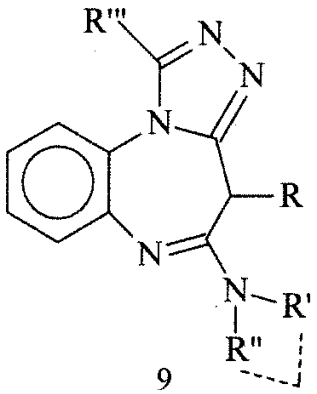
7

l-alkyl-5-aryl-l, 5-benzodiazepines bearing either arylureido14-16 or (aryloxycarbonyl) amino groups at the C-3 position 8 have been reported as CCK.2 antagonists. Brain neurotransmitter cholecystokinin (CCK.2)4.



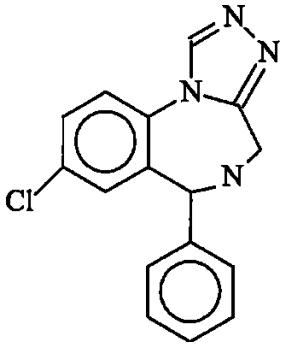
8

A new class of 4H-[l, 2, 4] triazolo (4, 3-a] [I, 5] benzodiazepine derivatives 9, Displayanalgesic and anti-inflammatory activities.



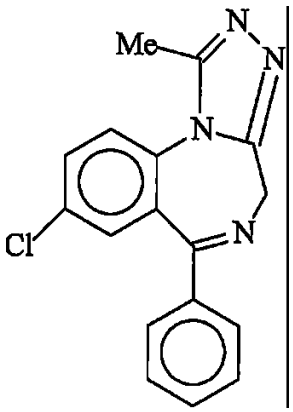
9

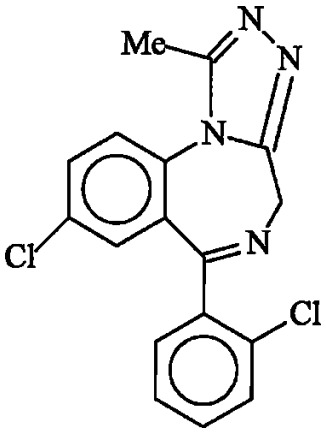
The psychotropic activity of some 4H-[l,2,4]triazolo[4,3-a] [l,4]benzodiazepine derivatives is well known. Estazolam **10,**



10

Alprazolam 11 and triazolam **12** are presently available for clinical use as hypnotics or tranquilizers.

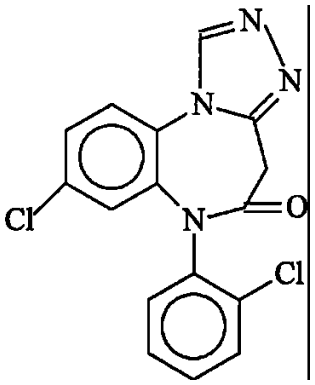




11 12

Analogous tricyclic derivatives were also prepared starting from the 1, 5-benzodiazepine system in order to obtain new compounds provided with central nervous system (CNS) activity.

For instance, the 4H- [1, 2, 4] triazole [4, 3-a][l, 5]benzodiazepine derivatives **13, 14** were actually active as anticonvulsants.



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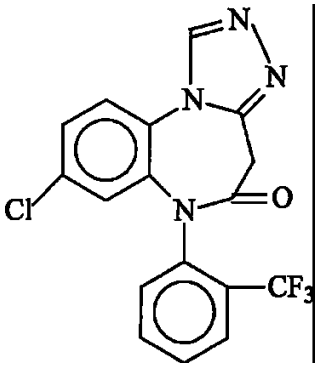
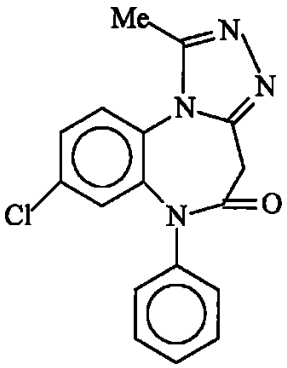


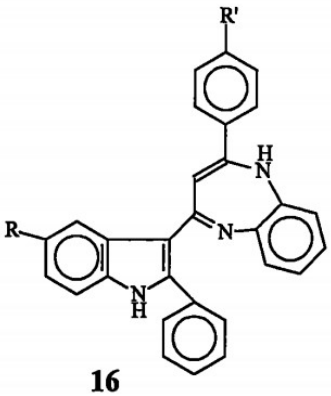
M

Molecule **15** showed CNS depressant properties.



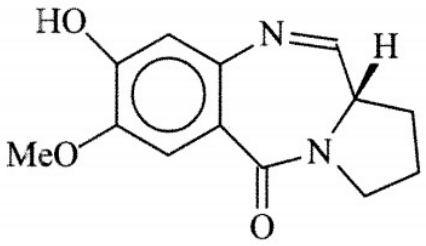
15

7-substitutedphenyl-5-(5'-substituted-2'-phenylindol3'-yl) 1-4-benzo[b]diazepines **16** showed good analgesic and anti-inflammatory activity.

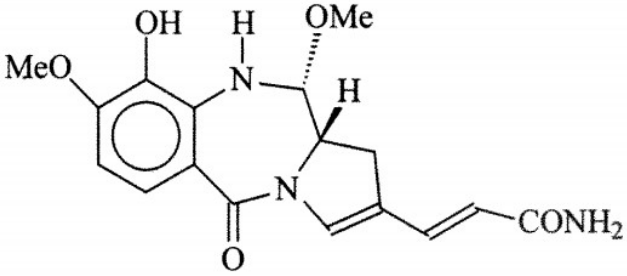


16

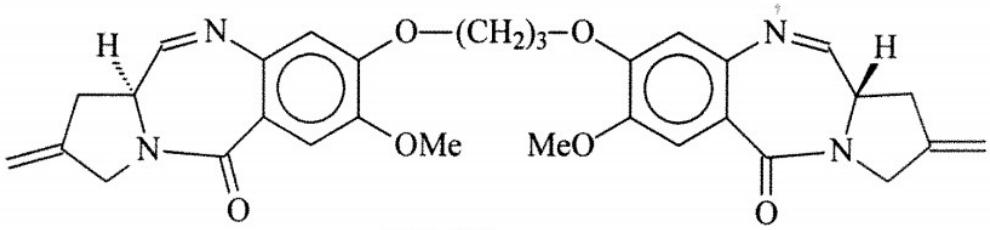
The pyrrolo[2,l-c][l,4]benzodiazepines(PBDs) are a group of potent ,naturally occurring, antitumor antibiotics produced by various streptomyces species. A number naturally occurring and synthetic compounds based on this PBD ring system, such asanthramycin, mchicamycin, abbeyeymycin, DC-81 and its dimmers have shown varying degree of DNA binding affinity and anticancer activity.



DC-81

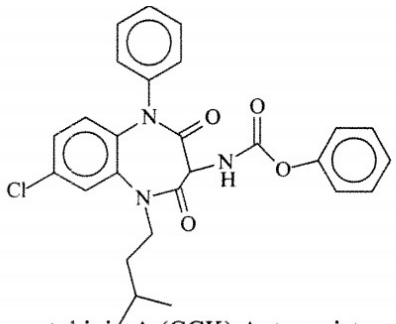


Anthramycin

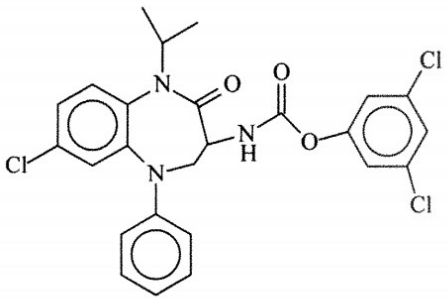


SJG-136

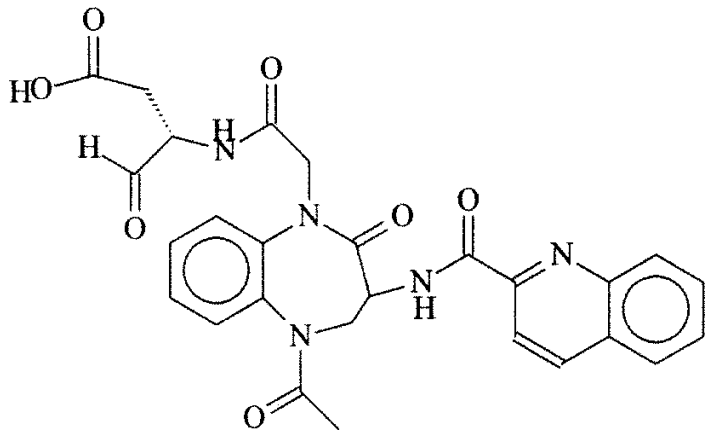
The 1,5-benzodiazepines core is indeed a privileged scaffold found compounds active against a variety of target types including peptide hormones (such as CCK), Interleukin converting enzymes (ICE) and potassium blockers.



Cholecystokinin A (CCK) Antagonist

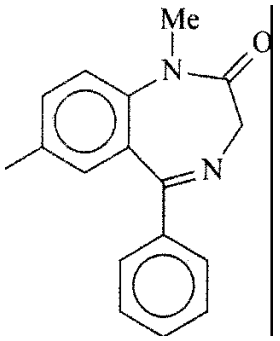


IK Blockers

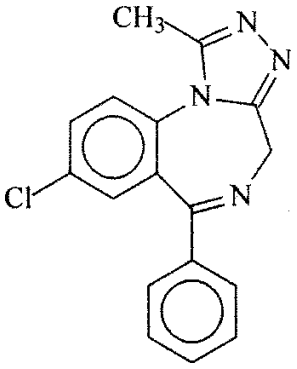


Interleukin converting enzymes

Whereas 1, 4-benzodiazepines -2, 5-diones are anticonvulsant and potent inhibitors of platelet aggregation. Drugs currently in use in the treatment of anxiety, panic, schizophrenia, and sleep disorders contain the 1, 4-benzodiazepine core (Valium and Xanax).



Valium



Xanax

2, 3-Benzodiazepines have been evaluated for their anticonvulsant, anti epileptic and anti seizure properties.

CHAPTER-1

GENERAL INTRODUCTION:

Benzodiazepines, also known as benzos, belong to class of psychoactive drugs whose main chemical structure is the fusion of a benzene ring and a diazepine ring. The first such drug, chlordiazepoxide, was discovered accidentally by Leo Sternbach in 1955, and was made available in 1960 by Hoffmann–La Roche, which, since 1963, has also marketed the benzodiazepine diazepam (Valium).[1] In 1977 benzodiazepines were globally the most prescribed medications.[2] They are in the family of drugs commonly known as minor tranquilizers.[3]

Benzodiazepines enhance the effect of theneurotransmittergamma-aminobutyric acid(GABA) at the $GABA_A$ receptor, resulting in sedative, hypnotic (sleep-inducing), anxiolytic (anti-anxiety), anticonvulsant, and muscle relaxant properties. High doses of many shorter-acting benzodiazepines may also cause anterograde amnesia.[4] These properties make benzodiazepines useful in treating anxiety, insomnia, seizures, muscle spasms, alcohol withdrawal and as a premedication for medical or dental procedures.[5] Benzodiazepines are categorized as either short, intermediary, or long-acting. Short- and intermediate-acting benzodiazepines are preferred for the treatment of insomnia; longer-acting benzodiazepines are recommended for the treatment of anxiety.[6]

Benzodiazepines are generally viewed as safe and effective for short-term use, although cognitive impairment and paradoxical effects such as aggression or behavioral disinhibition occasionally occur. A minority of people can have paradoxical reactions such as worsened agitation or panic.[7] Benzodiazepines are also associated with increased risk of suicide.[8] Long-term use is controversial because of concerns about decreasing effectiveness, physical dependence, withdrawal, and an increased risk of dementia and cancer.[9][10][11][12] In the long-term, stopping benzodiazepines often leads to improved physical and mental health.[13][14] The elderly are at an increased risk of both short and long-term adverse effects,[13][15] and as a result, all benzodiazepines are listed in the Beers List of inappropriate medications for older adults.[16] There is controversy concerning the safety of benzodiazepines in pregnancy. While they are not major teratogens, uncertainty remains as to whether they cause cleft palate in a small number of

babies and whether neurobehavioral effects occur as a result of prenatal exposure;[17] they are known to cause withdrawal symptoms in the newborn.

Benzodiazepines can be taken in overdoses and can cause dangerous deep unconsciousness. However, they are less toxic than their predecessors, the barbiturates, and death rarely results when a benzodiazepine is the only drug taken. When combined with other central nervous system (CNS) depressants such as alcoholic drinks and opioids, the potential for toxicity and fatal overdose increases.[18][19] Benzodiazepines are commonly misused and taken in combination with other drugs of abuse.[20][21][22]

Medicinal uses of Benzodiazepine:

Most are administered orally; however, they can also be given intravenously, intramuscularly, or rectally.[23] In general, benzodiazepines are well tolerated and are safe and effective drugs in the short term for a wide range of conditions.[24][25] Tolerance can develop to their effects and there is also a risk of dependence, and upon discontinuation a withdrawal syndrome may occur. These factors, combined with other possible secondary effects after prolonged use such as psychomotor, cognitive, or memory impairments, limit their long-term applicability.[26][27]The effects of long-term use or misuse include the tendency to cause or worsen cognitive deficits, depression, and anxiety. The College of Physicians and Surgeons of British Columbia recommends discontinuing the usage of benzodiazepines in those on opioids and those who have used them long term.[28] Benzodiazepines can have serious adverse health outcomes, and these findings support clinical and regulatory efforts to reduce usage, especially in combination with non-benzodiazepine receptor agonists.[29]

Physico-chemical, acoustical and solubility of drugs are useful in field of pharmaceutical sciences to examine their functions and performance [30]. Physical and acoustical properties like density, viscosity and ultrasound velocity of solution of pharmaceutical molecules in polar and non-polar solvents provide valuable information about solute-solvent interaction.[31] This information is useful for drug formulation, drug dosages, synthesis and predicting the absorption and transport of drugs in biological tissues.[32] Apart from this other the study of ultrasound velocity and related parameters for drug-solvent interactions are important to understand the behavior of bio-molecules and physico-chemical nature of solutions.[33]

These parameters are useful in a number of areas such as medical, sedimentology, food processing, paper industry and biotechnology. Ultrasonic methods have been successfully used to monitor polymer processing, chemical reactions, film formation, glue processing or crystallization in polymers.

Today, the use of ultrasonic for non-destructive evaluation of system is widespread. The ultrasonic parameters such as velocity, attenuation, compressibility, acoustic impedence and scattering gives a clear picture of structural changes in biological substances. In the recent years, the use of ultrasound has greatly increased because of the advantage it offers to synthetic chemistry. It includes time consumption in reaction, saving energy, higher yield, milder condition and higher purity of the product. Density and viscosity measurements are helpful in study of ion-solvent interactions in aqueous and non-aqueous solutions.

Nowadays, the uses of ultrasound for non-destructive evaluation of system are widespread. The ultrasonic parameters such as velocity, compressibility, acoustical impedance gives clear picture of structural of structural changes in biology substances. In recent years, the usage of ultrasound as increased because of advantages it gives to synthetic chemistry. It includes time consumption in reaction, saving energy, higher yield, milder conditions and higher purity of product. Ultrasound velocity measurements are helpful in the study of ion-solvent interactions in aqueous and non-aqueous solutions in recent years.

Acoustical parameters are employed in various fields in investigating various organic liquids, polymers along with their mixtures, drugs etc. It plays an important role in understanding physico-chemical behavior of liquids. Knowledge of ultrasound velocity and related acoustical parameter provides information about molecular interaction and hence nature and strength of these interactions are useful in solution processing technology. The study on changes in acoustical properties of solution has been found to be an excellent qualitative and quantitative way to bring out the information about molecular structure and inter molecular forces present in liquid mixtures.[34]

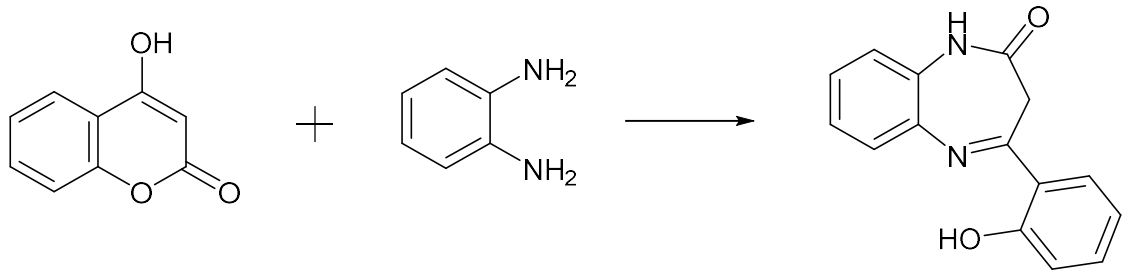
Accuracy and precision in solubility, density and viscosity measurements allow one to calculate many interesting thermodynamicand thermo-acoustical properties of industrial and environmental concerns with high degree of reliability.[35-37]

CHAPTER-2

SYNTHESIS OF

1,3-Dihydro-4-(2-hydroxyphenyl)-2H-1,5-benzodiazepin-2-one:

Section-2.1: Reaction Scheme

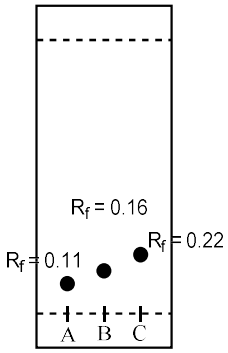


4-hydroxy-2*H*-chromen-2-one
Chemical Formula: $C_9H_6O_3$
Molecular Weight: 162.14

benzene-1,2-diamine
Chemical Formula: $C_6H_8N_2$
Molecular Weight: 108.14

4-(2-hydroxyphenyl)-1,3-dihydro-2*H*-benzo[*b*][1,4]diazepin-2-one
Chemical Formula: $C_{15}H_{12}N_2O_2$
Molecular Weight: 252.27

TLC:



Where,

A = 4-hydroxy coumarin

B = O-phenylene diamine

C = 1,3-Dihydro-4-(2-hydroxyphenyl)-2H-1,5-benzodiazepin-2-one

Solvent system:

Hexane: Ethyl acetate (8:2)

Section-2.2: Method

- Here we are synthesizing a drug named1,3-Dihydro-4-(2-hydroxyphenyl)-2H-1,5-benzodiazepin-2-one.
- The method for the synthesis of this drug as follows:
- Take 1.62 gram 4-hydroxy coumarin and 1.62gram O-phenylene diamine in a 10mL RBF.
- Further add required amount of toluene solvent.
- Then reflux the reaction mixture for 5 hours at 110°C (±5°C) temperature with constant magnetic stirring.
- After 5 hours of reflux the reaction mixture was checked by taking TLC.
- For removing the impurities, wash the product with appropriate amount of methanol which removes the impurities.
- After removing impurities, pure product is obtained which can be seen fromthe given TLC.[38]

CHAPTER-3

PHYSICO-CHEMICALPARAMETERS:

Section-3.1: Solubility

- Solubility is one of vital physico-chemical properties of pharmaceutical compounds. Major drug with high level of biological activity often fail in investigation to form new drug because of low solubility. Further solution crystallization is an important step for industrial purification process, which control product quality such as purity and yield. Hence it is necessary to determine physico-chemical data such as solubility in difference solvents to select the proper solvent.[39]

Method:

- **Procedure for the preparation of unknown solutions:**

- Accurately weigh 0.05 gm drug with help of electronic weight balance and transfer it into 7 different vials containing rice needles.
- Then add 3 mL of solvent in these vials.
- The solvents required are water, methanol, ethanol, 1,4-dioxane, DMF, DCM and chloroform.
- Put these vials in water bath for constant stirring at 30°C temperature and 300 rpm for 24 hours.
- Monitor the temperature using thermometer.
- After 24 hours, centrifuge the vials for 20 min at 400 rpm. These will result into settle down the particles.
- Post centrifugation, keep the vials undisturbed for 24 hrs

❖ **Procedure for the preparation of standard solutions:**

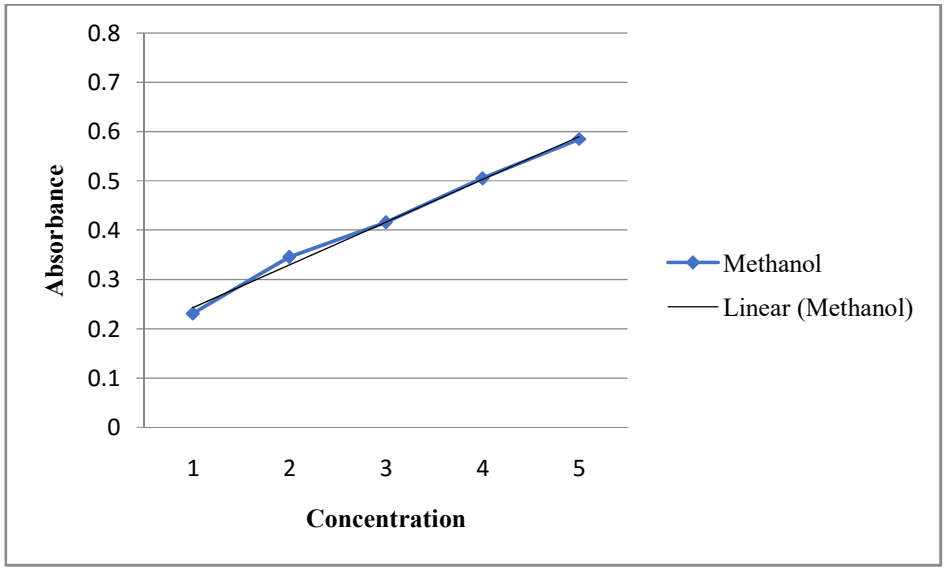
- Accurately weigh 10 mg of drug and carefully add into 10 mL volumetric flask and make a concentration of 1mg/1mL with the help of specific solvent. Label it as main stock solution.
- With the help of syringe take 2mL of main stock solution and add into 50mL volumetric flask.
- Make up to 50mL using specific solvent.

Consider theλmax value at 344 nm in each solvent:

Methanol:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.231	0.233	0.232	0.43%
2mg/100mL	0.346	0.345	0.345	0.17%
3mg/100mL	0.416	0.416	0.412	0.56%
4mg/100mL	0.582	0.580	0.581	0.17%
Unknown	0.505	0.502	0.503	0.30%

Try-1:



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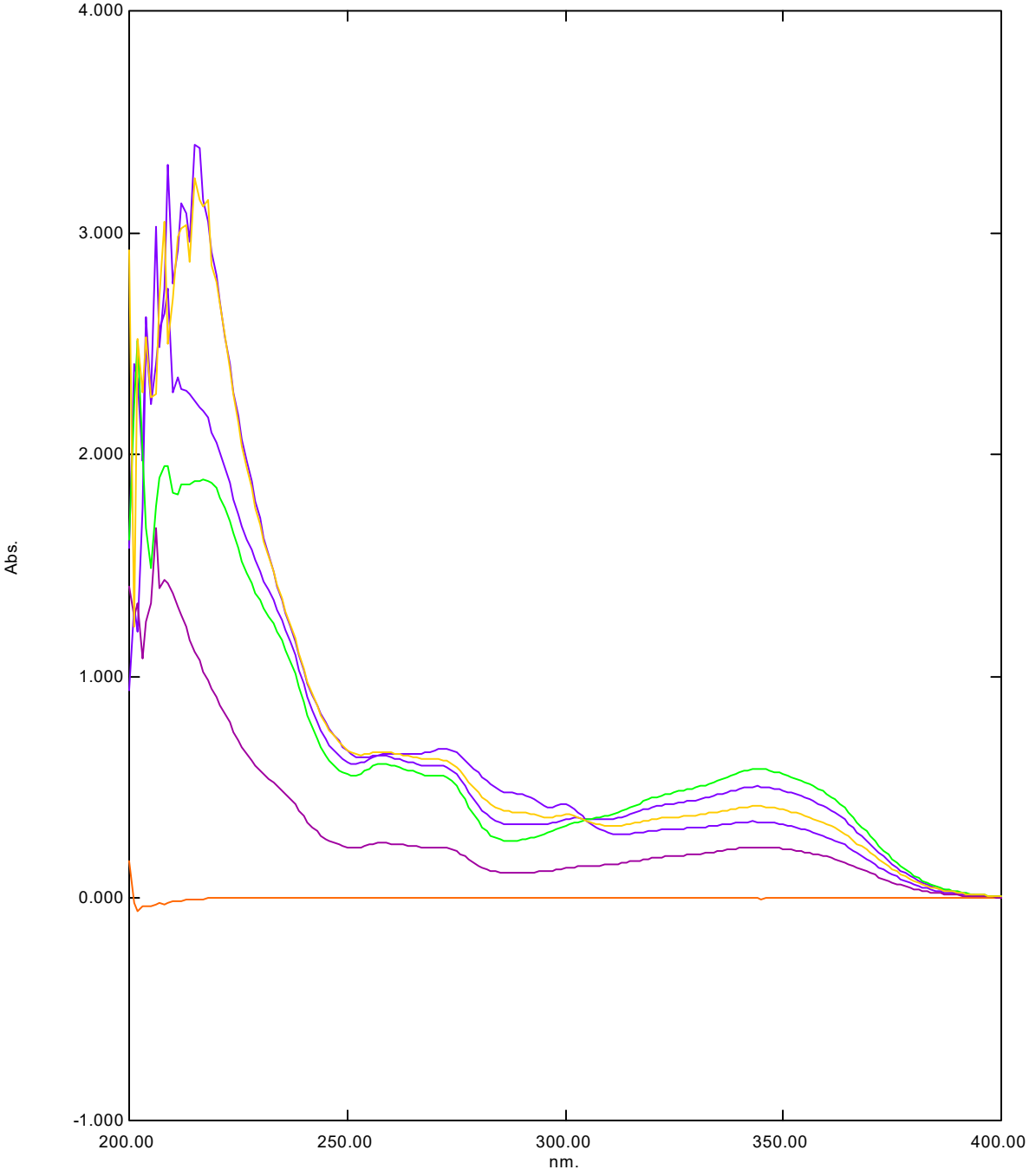

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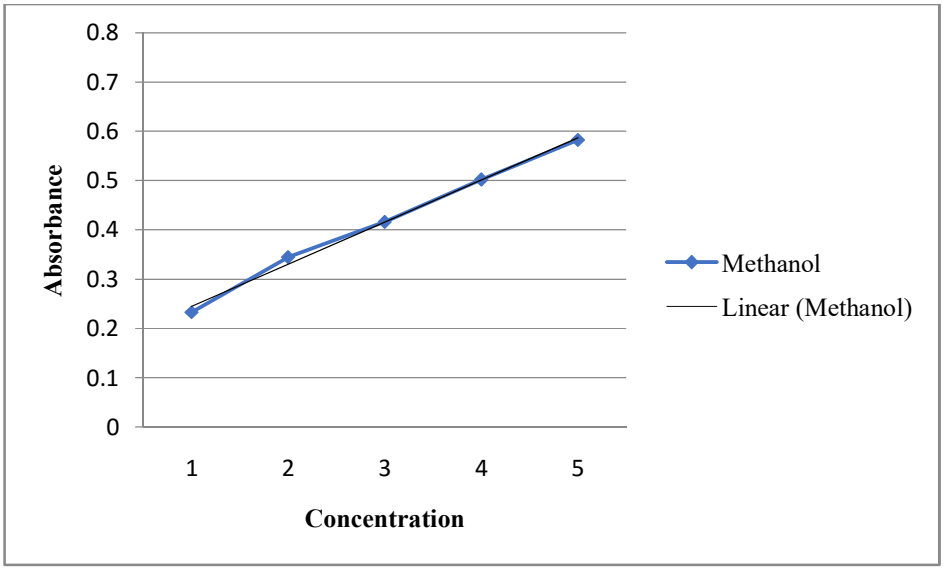
0.8
0.7
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0.5
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0.2
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Absorbance
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2
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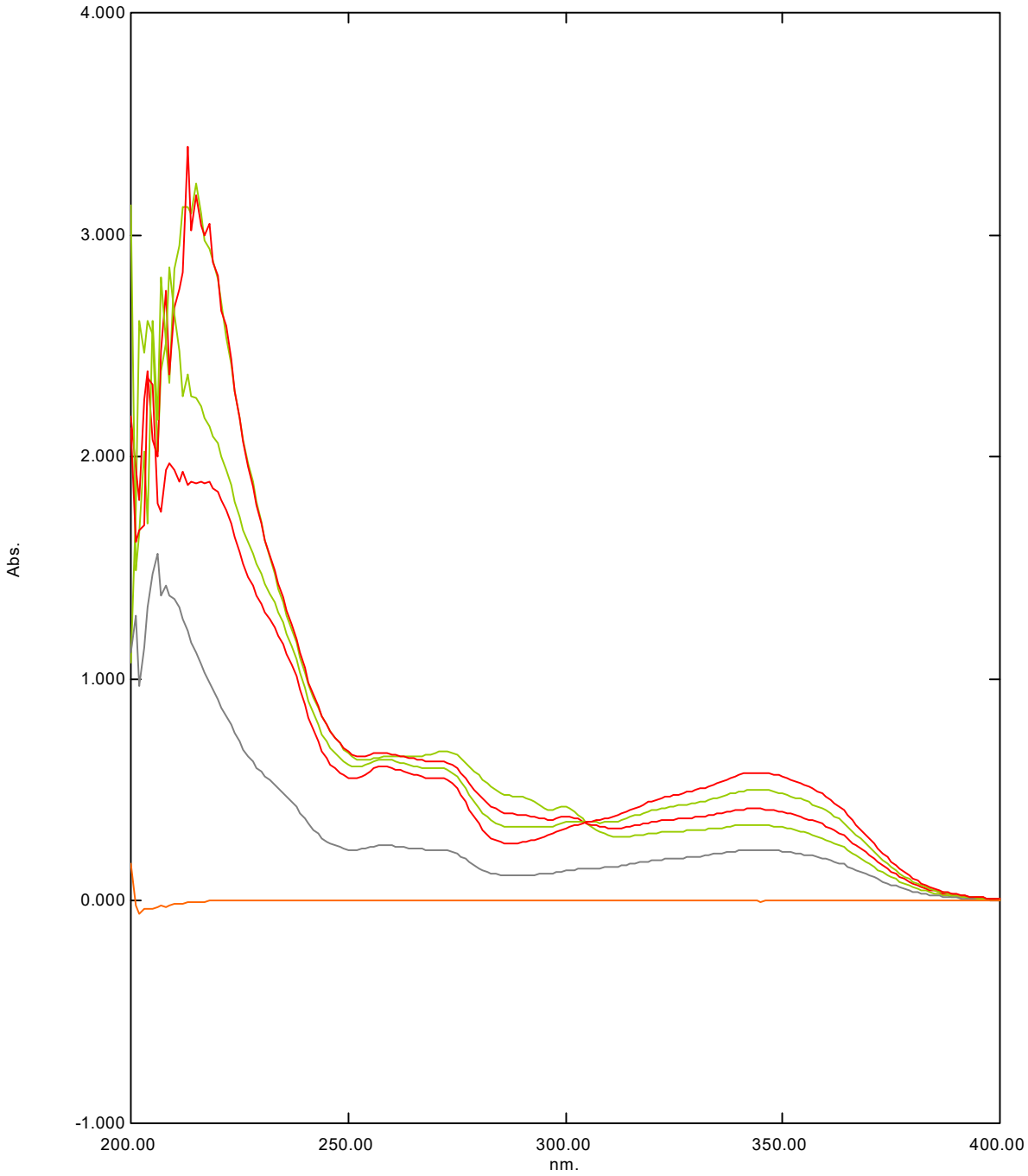
5
Concentration
Methanol
Linear (Methanol)

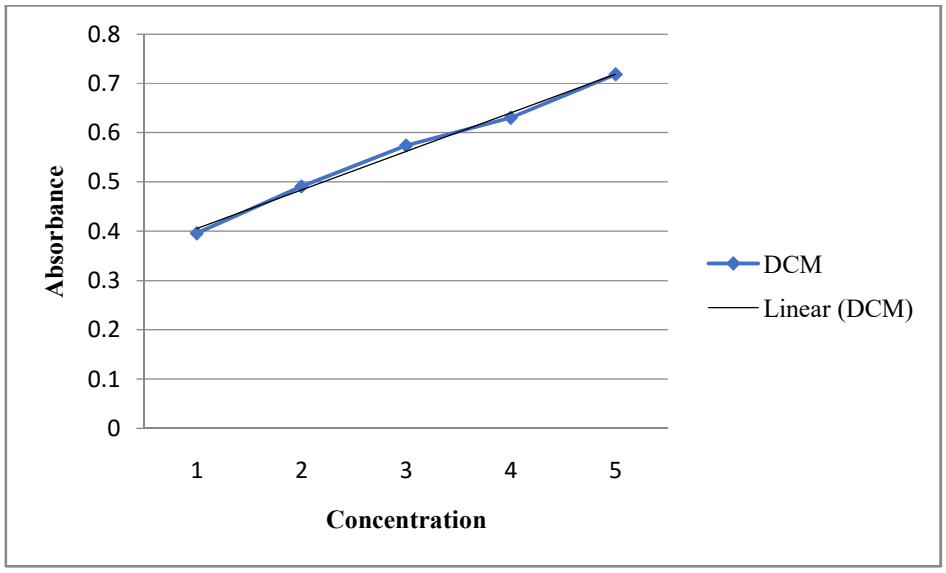
Try-2 Overlay:



DCM:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.396	0.397	0.399	0.39%
2mg/100mL	0.491	0.488	0.489	0.12%
3mg/100mL	0.574	0.571	0.571	0.10%
4mg/100mL	0.718	0.716	0.717	0.08%
Unknown	0.630	0.629	0.629	0.09%

Try-1:



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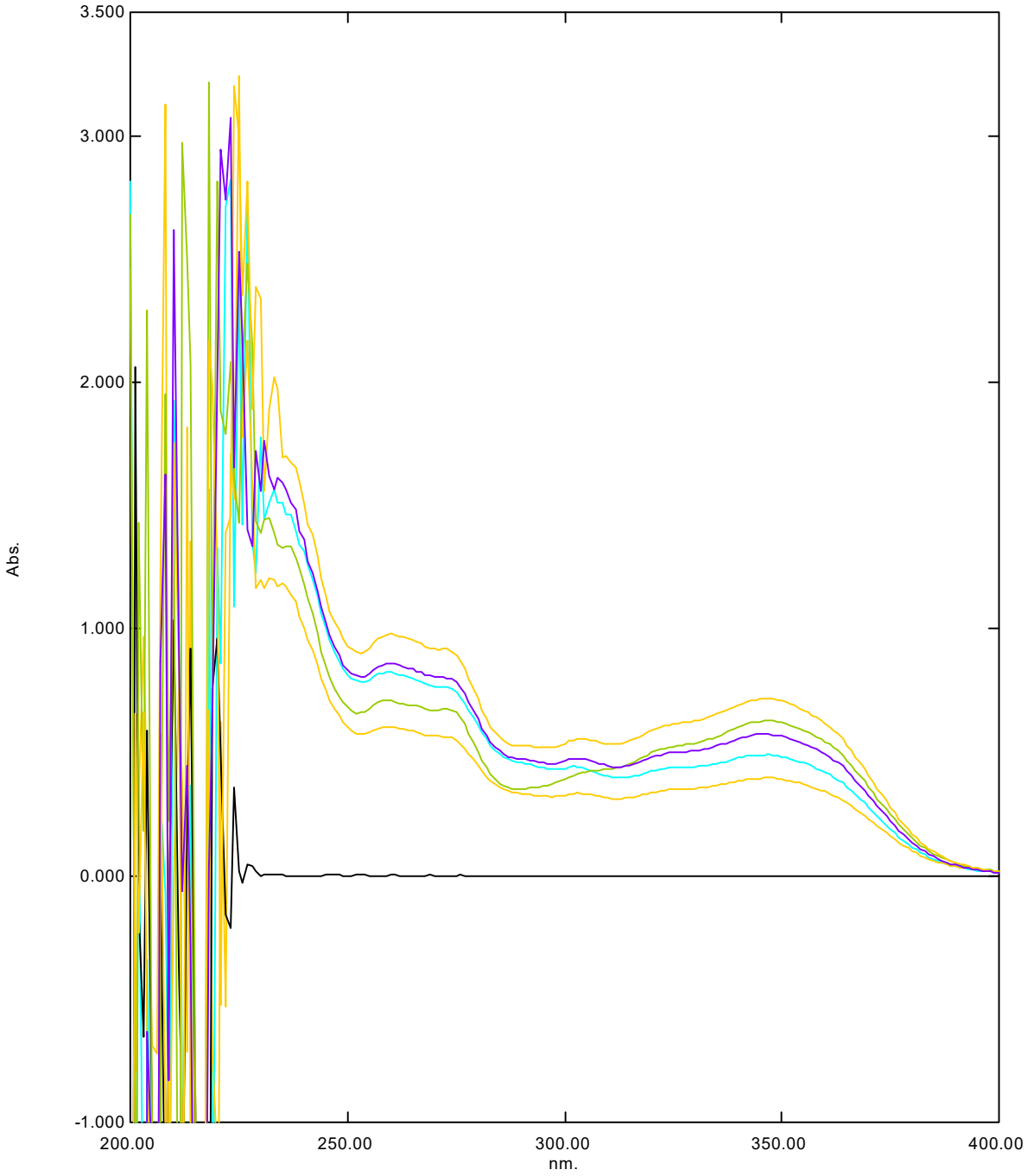

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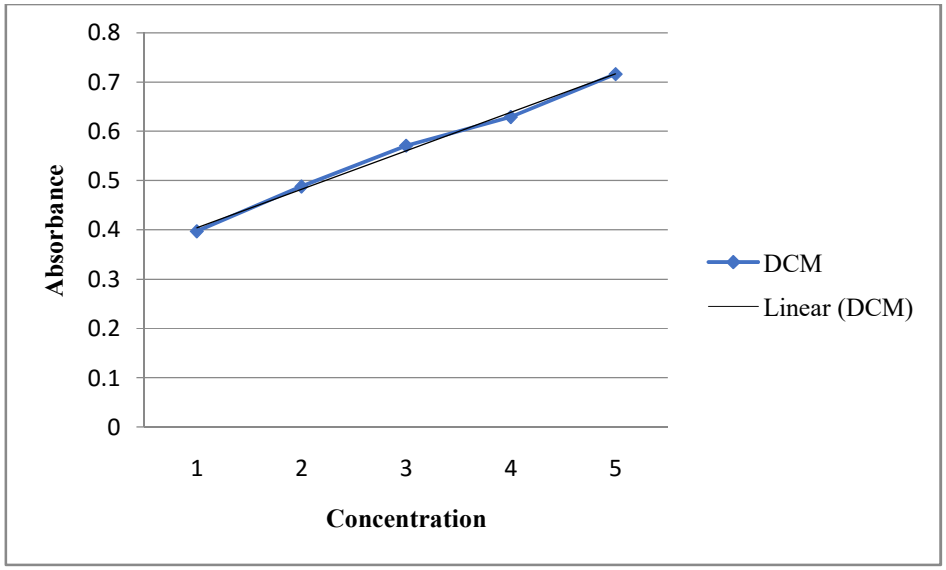
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Absorbance
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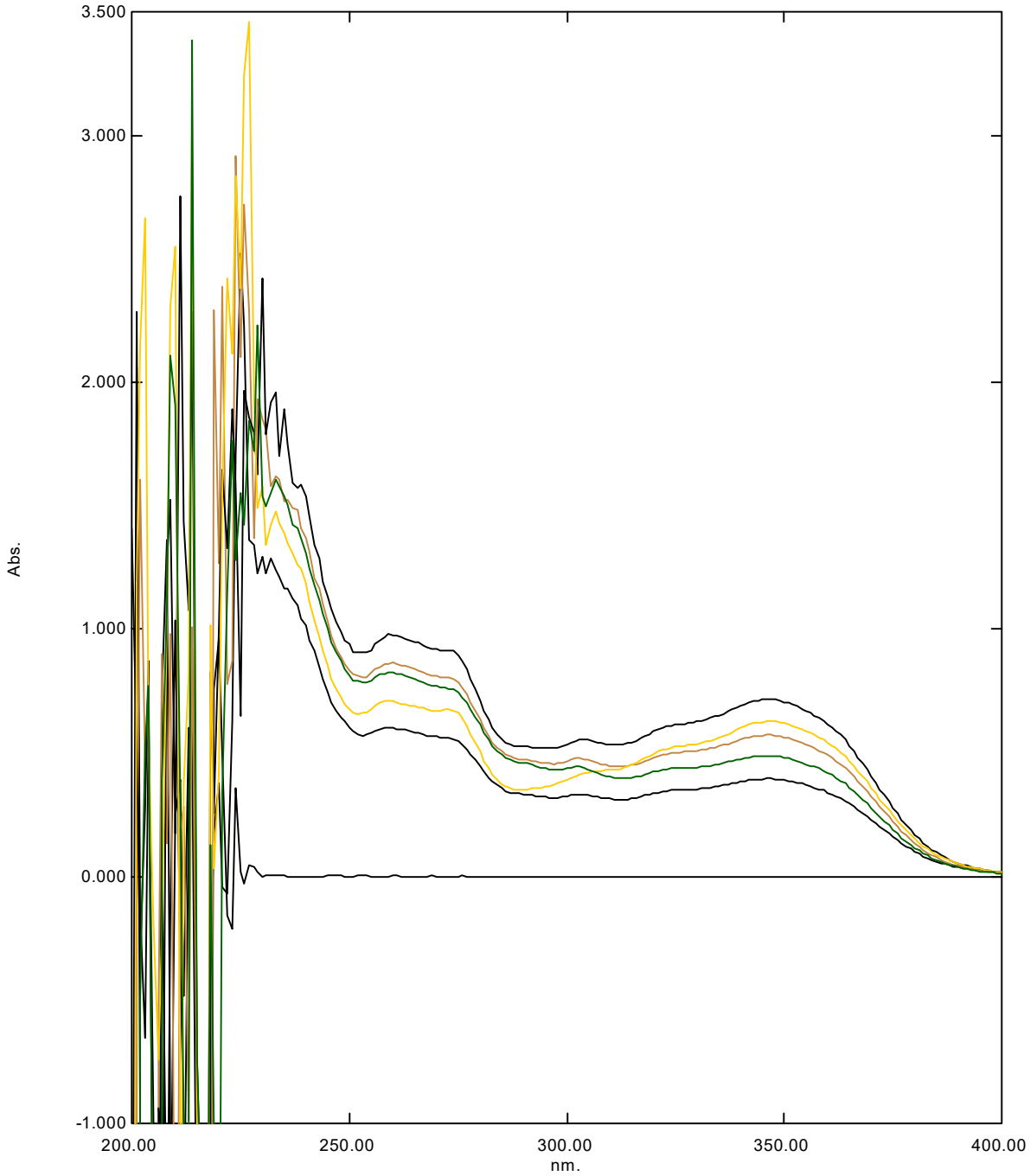
Concentration
DCM
Linear (DCM)

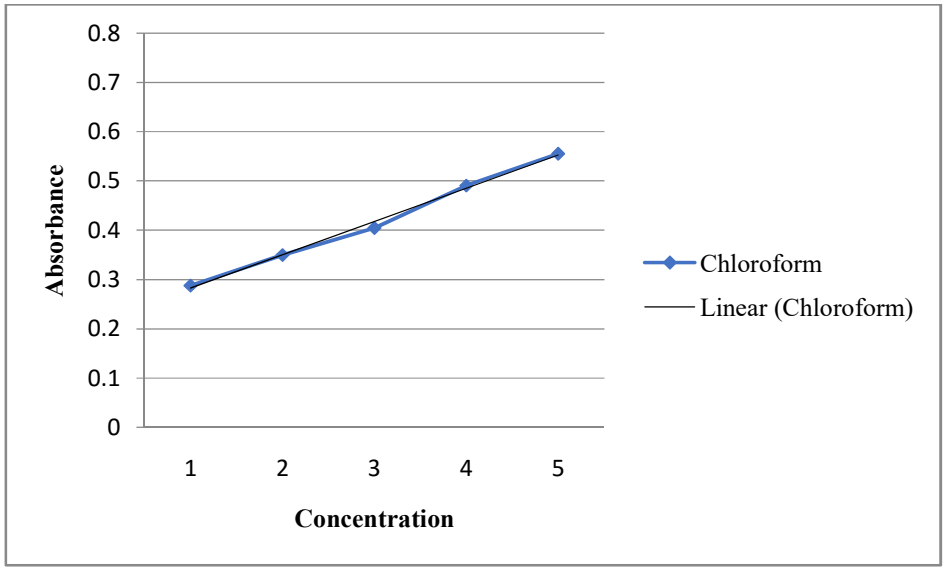
Try-2 Overlay:



Chloroform:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.288	0.289	0.288	0.52%
2mg/100mL	0.350	0.351	0.353	0.33%
3mg/100mL	0.405	0.407	0.409	0.14%
4mg/100mL	0.555	0.552	0.552	0.21%
Unknown	0.491	0.491	0.492	0.35%

Try-1:



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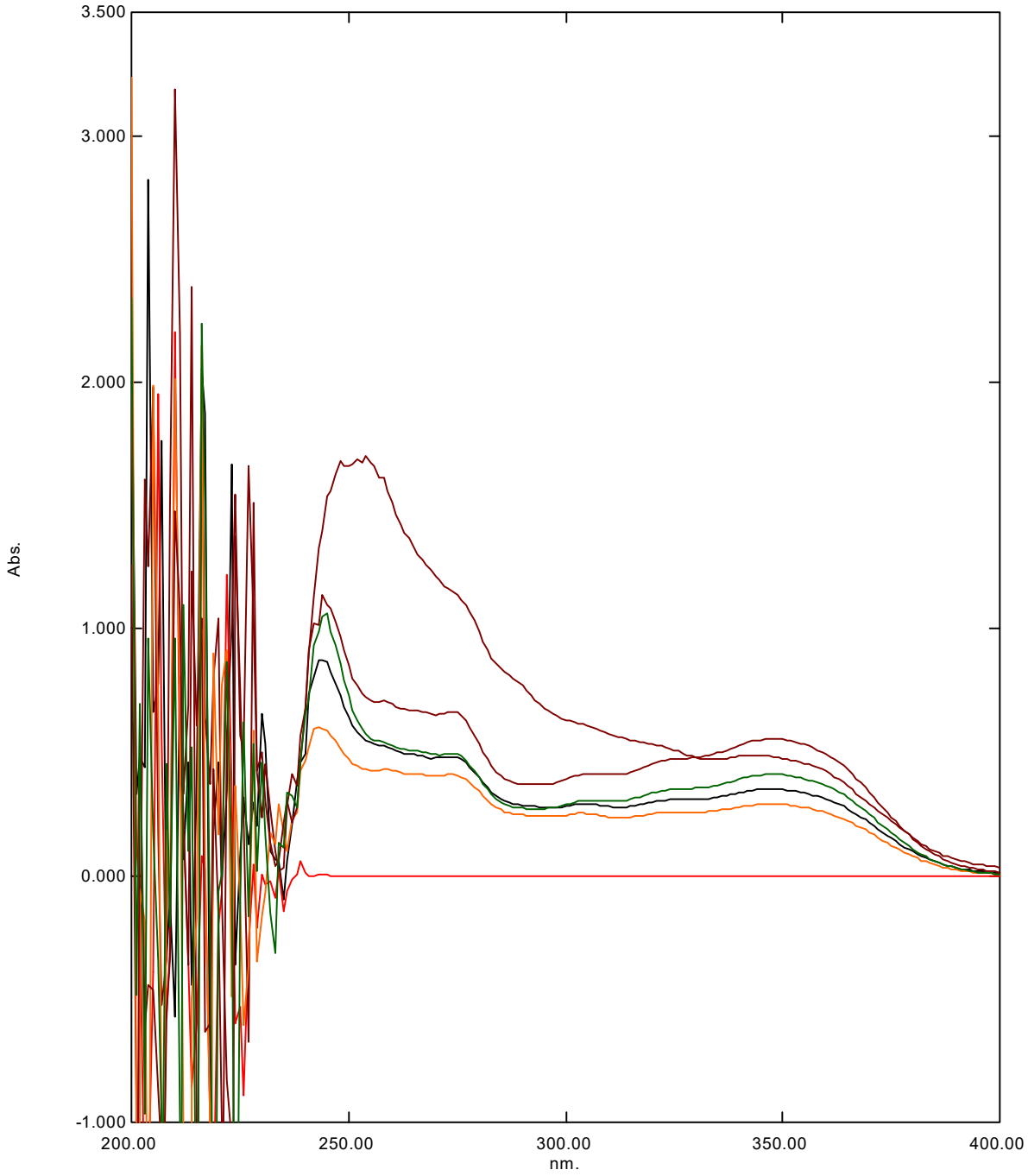

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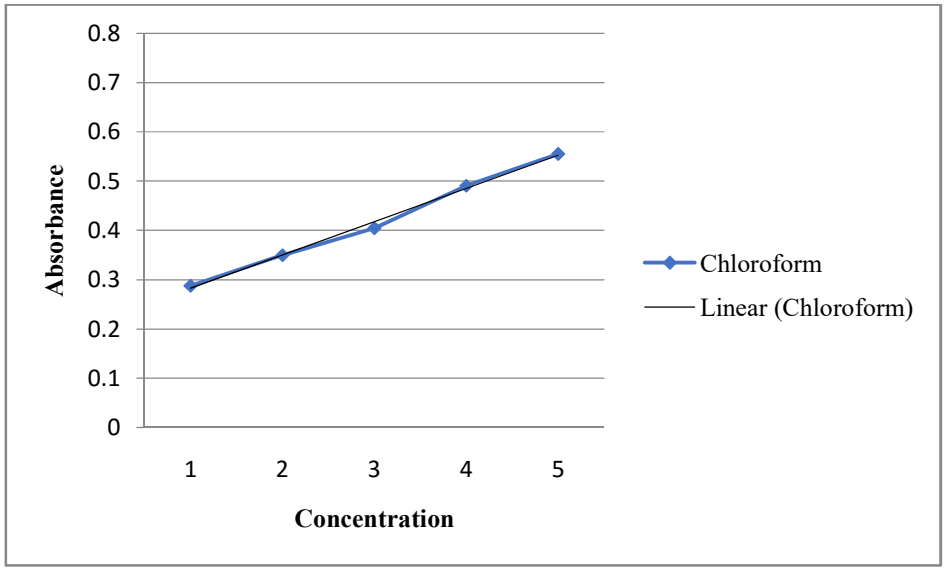
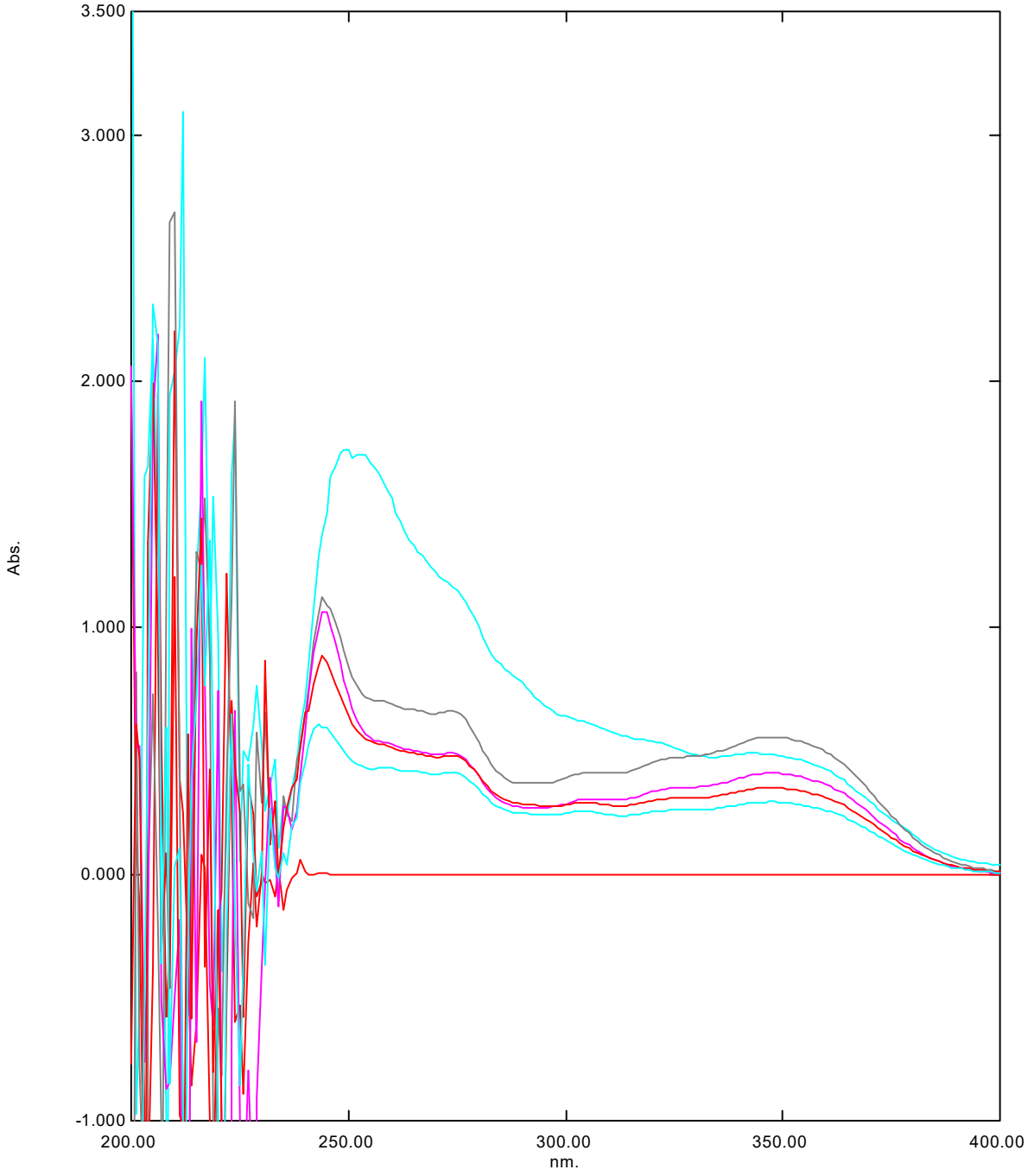

0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Absorbance
1
2
3
4
5
Concentration
Chloroform
Linear (Chloroform)

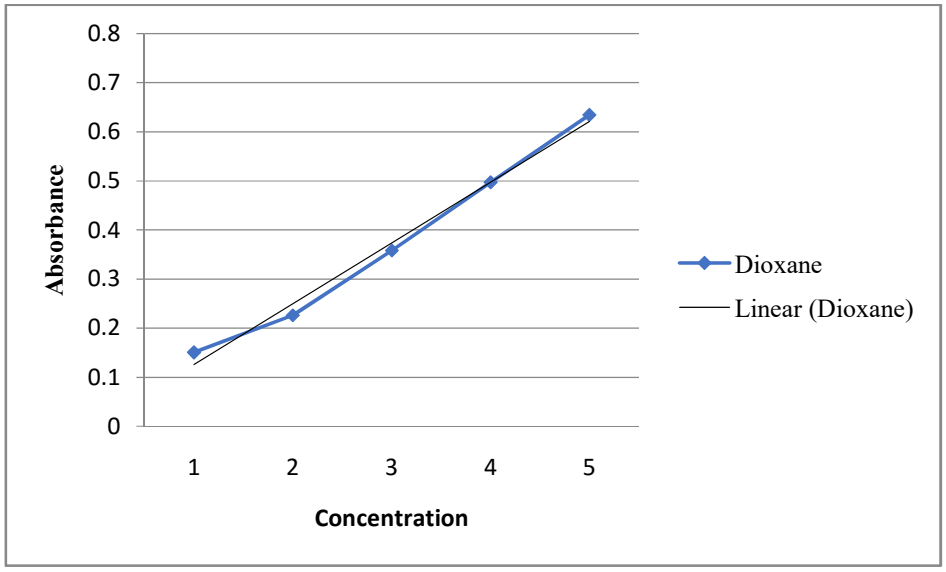
Try-2 Overlay:



Dioxane:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.150	0.150	0.149	0.00%
2mg/100mL	0.358	0.359	0.357	0.16%
3mg/100mL	0.497	0.498	0.497	0.12%
4mg/100mL	0.634	0.633	0.631	0.09%
Unknown	0.226	0.223	0.221	1.02%

Try-1:



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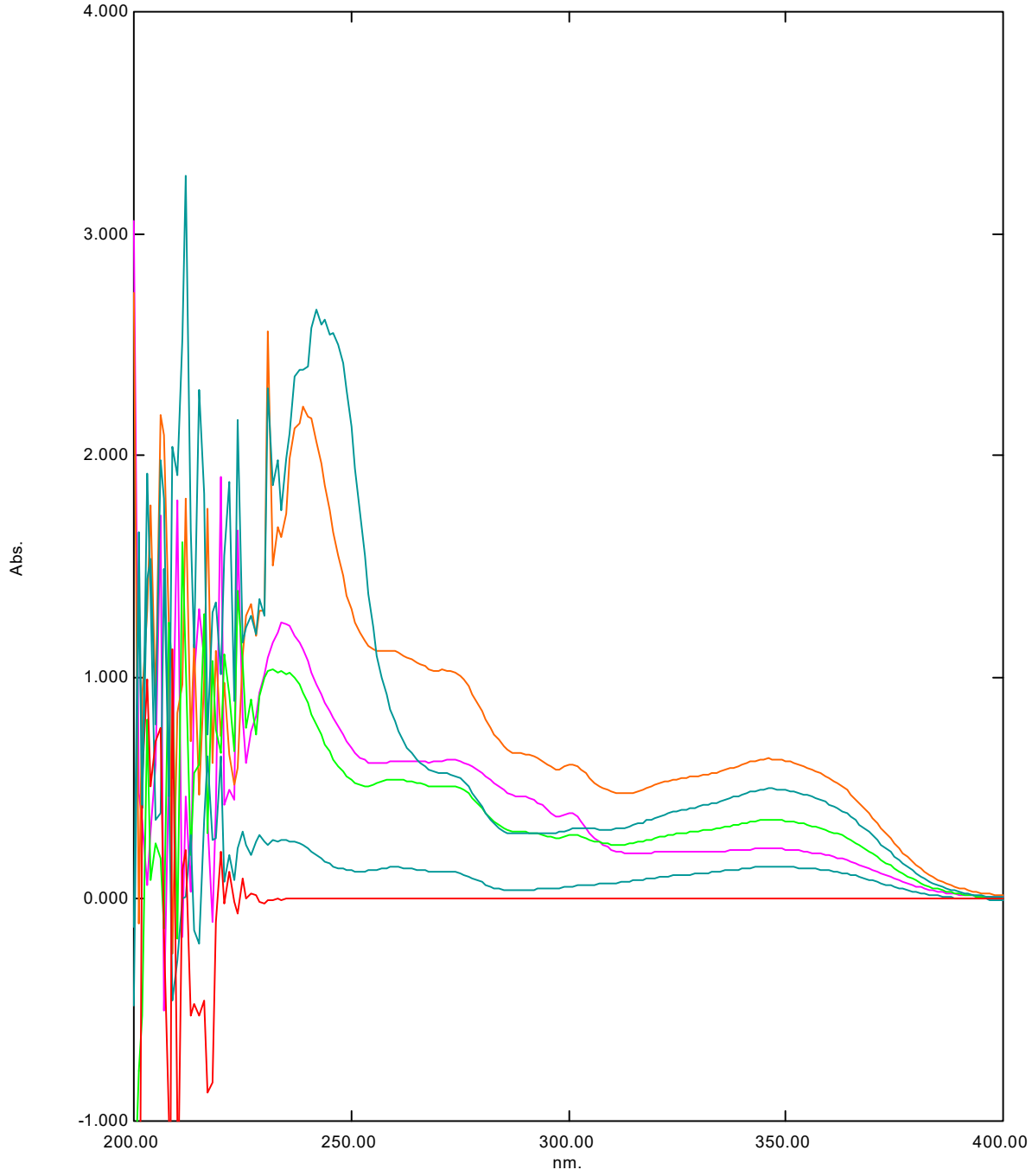

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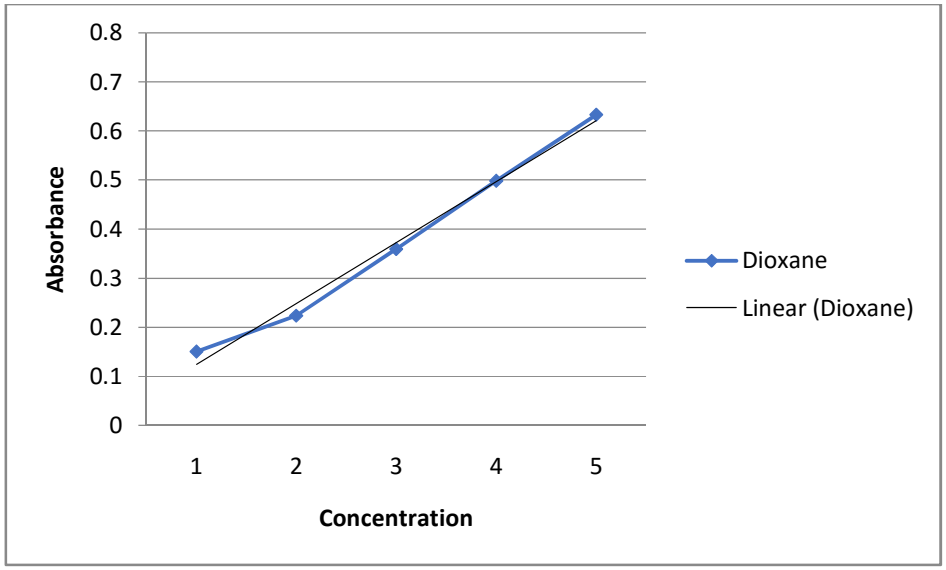
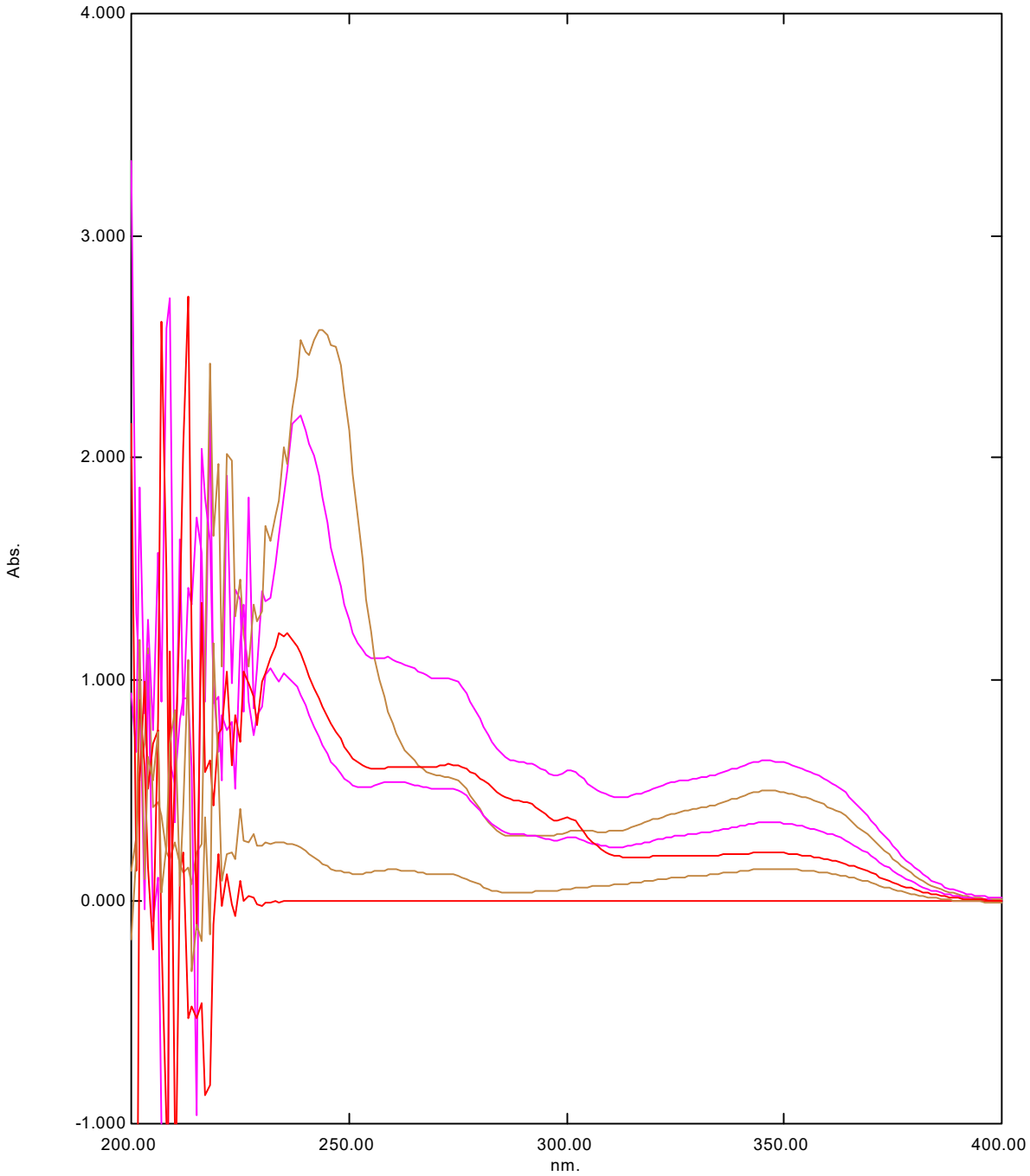

0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Absorbance
1
2
3
4
5
Concentration
Dioxane
Linear (Dioxane)

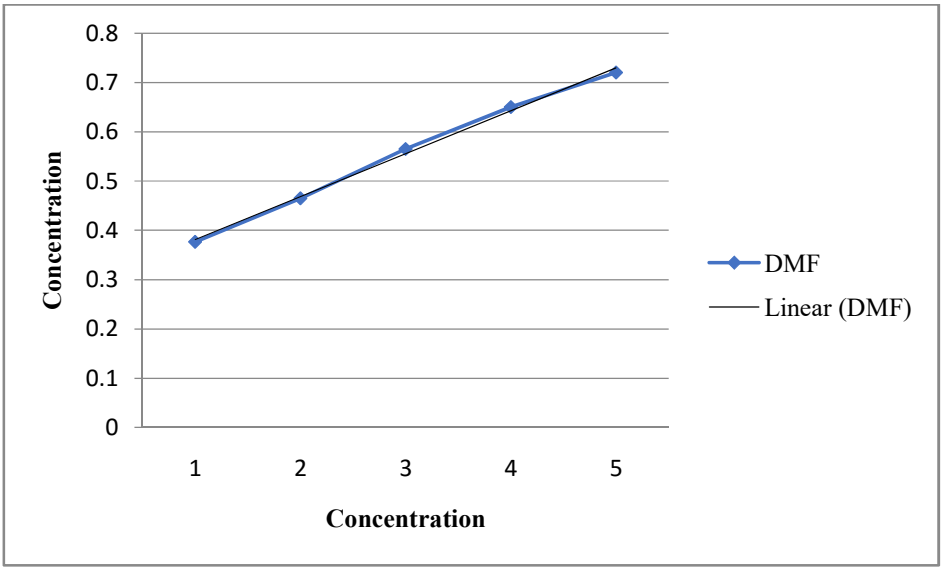
Try-2 Overlay:



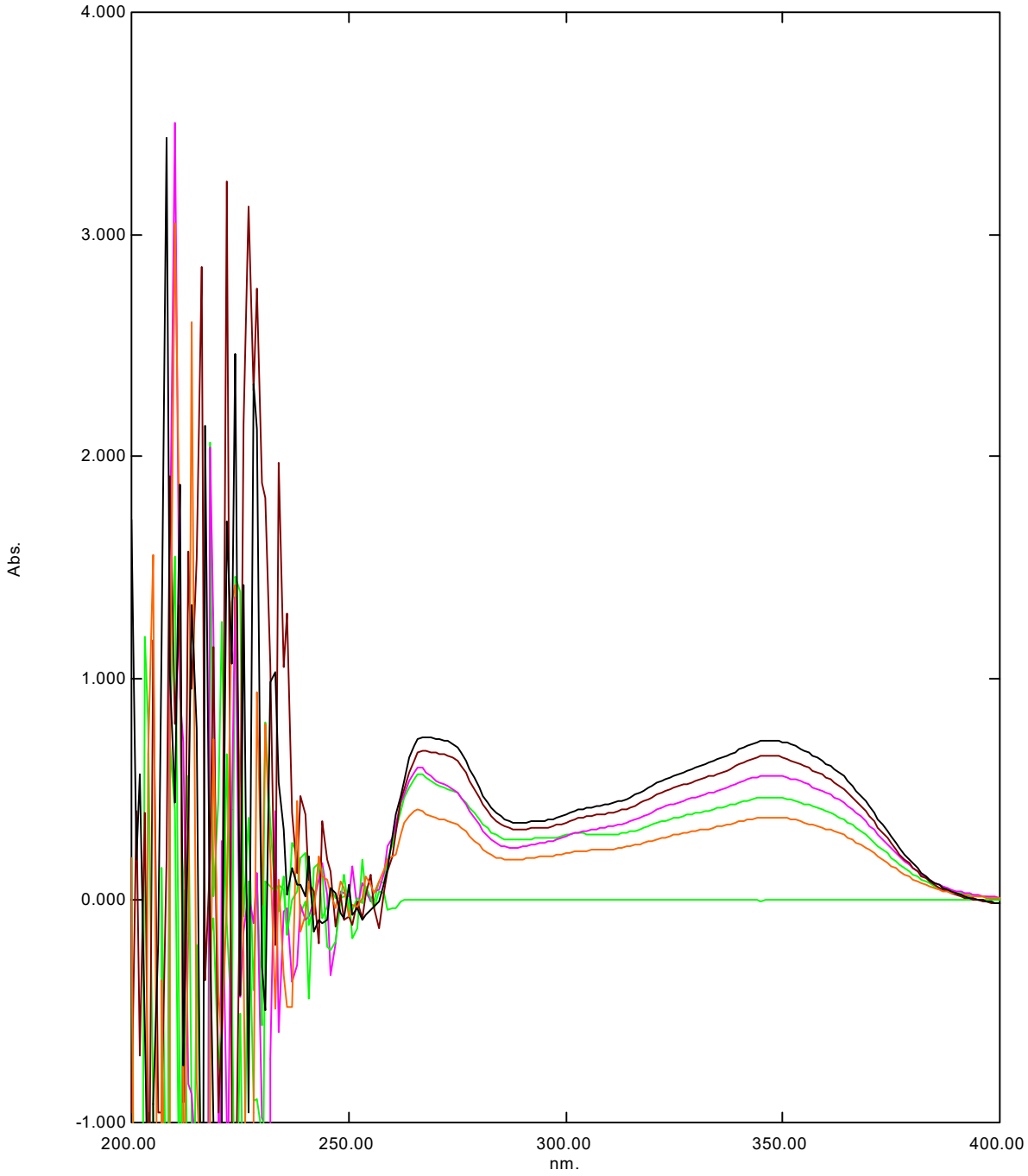
DMF:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.377	0.378	0.379	0.27%
2mg/100mL	0.465	0.465	0.464	0.25%
3mg/100mL	0.565	0.561	0.561	0.21%
4mg/100mL	0.720	0.721	0.727	0.32%
Unknown	0.650	0.653	0.653	0.18%

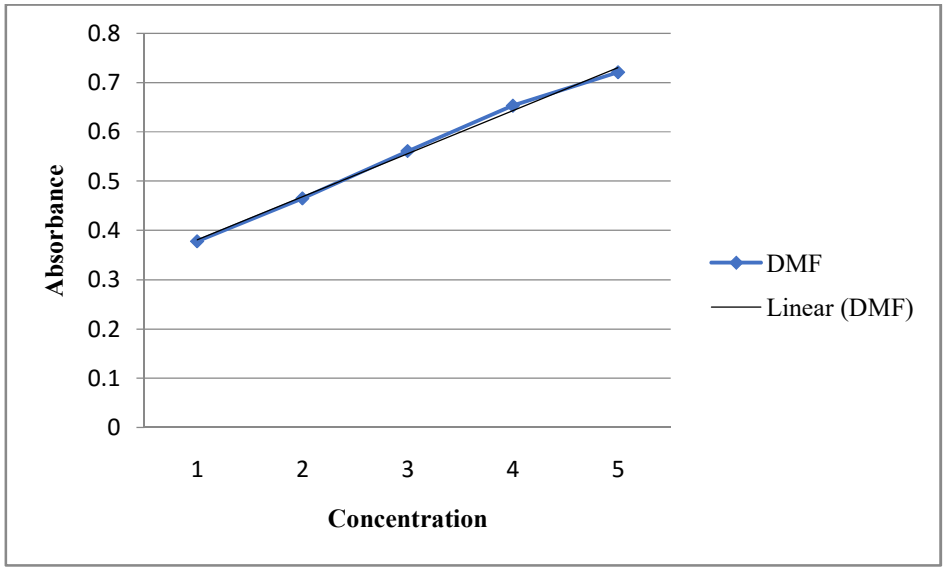
Try-1:



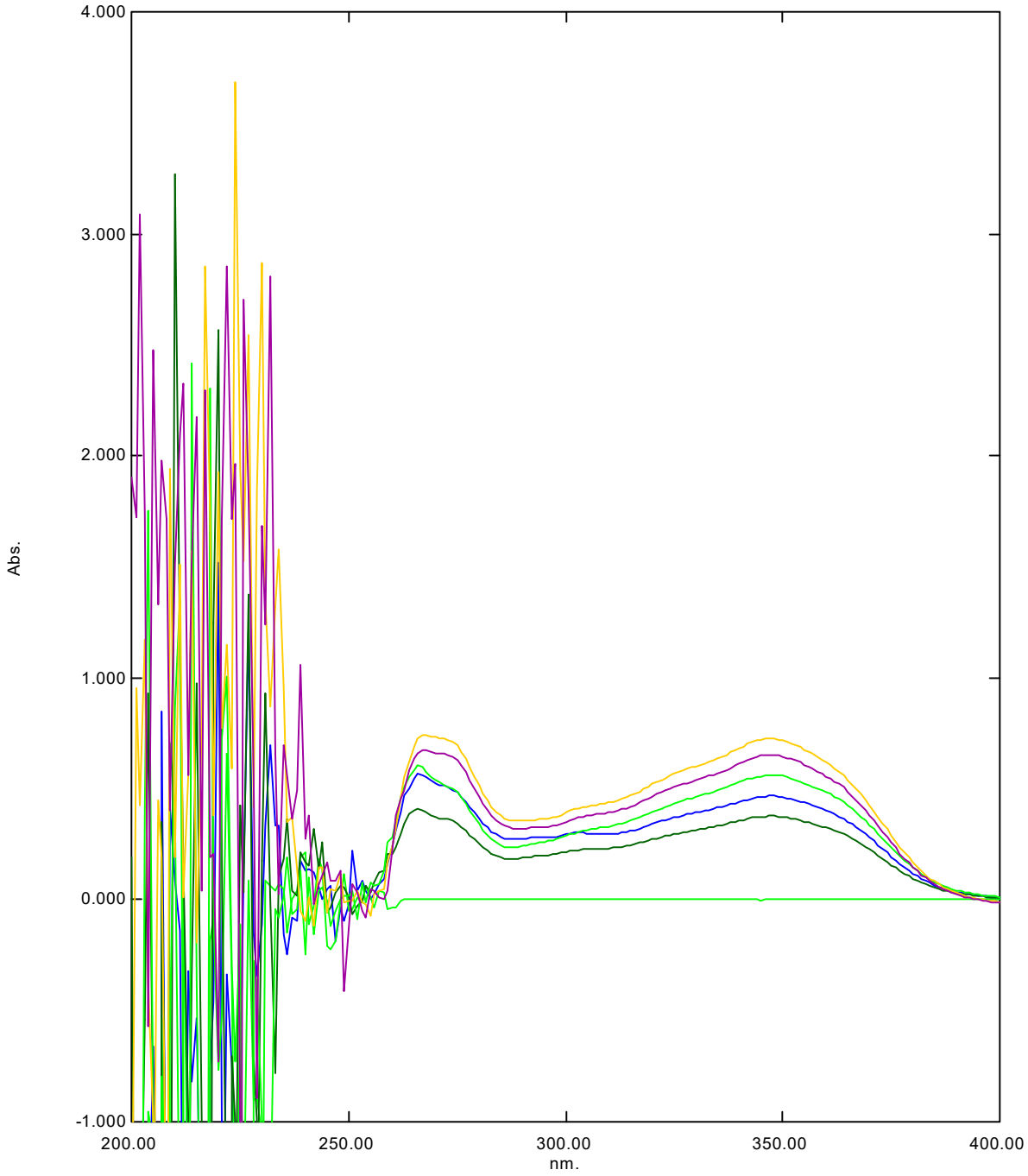
Try-1 Overlay:



Try-2:


0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Absorbance
1
2
3
4
5
Concentration
DMF
Linear (DMF)

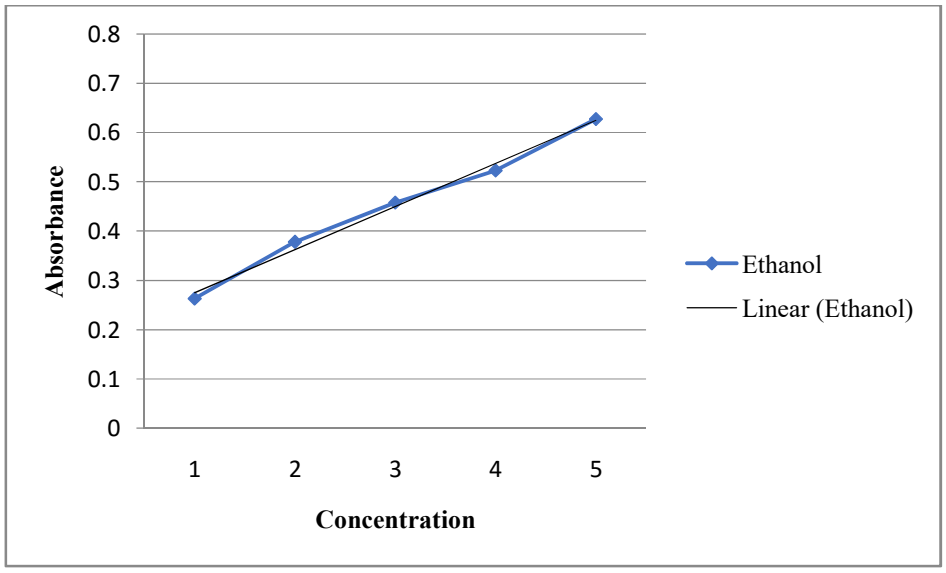
Try-2 Overlay



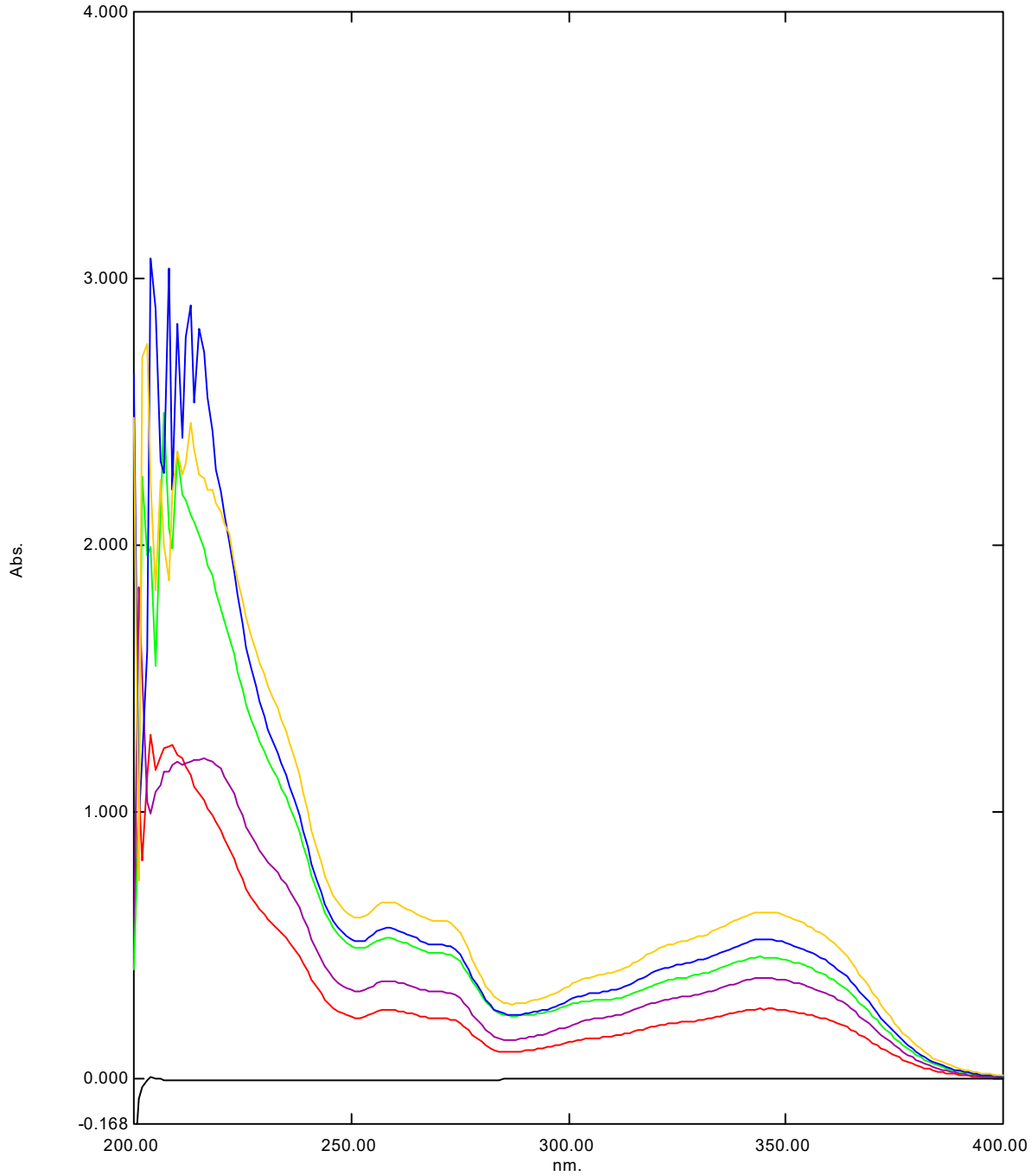
Ethanol:

Conc.	Absorption	Absorption	Absorption	RSD
	Try 1	Try 2	Try 3	
1mg/100mL	0.263	0.266	0.263	0.66%
2mg/100mL	0.458	0.456	0.458	0.25%
3mg/100mL	0.523	0.526	0.527	0.40%
4mg/100mL	0.627	0.626	0.627	0.09%
Unknown	0.378	0.376	0.373	0.67%

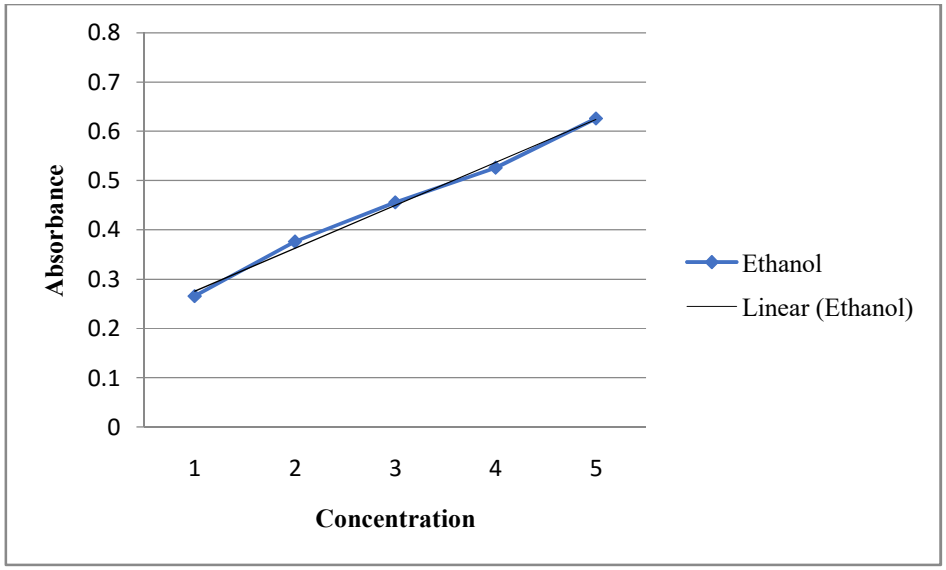
Try-1:



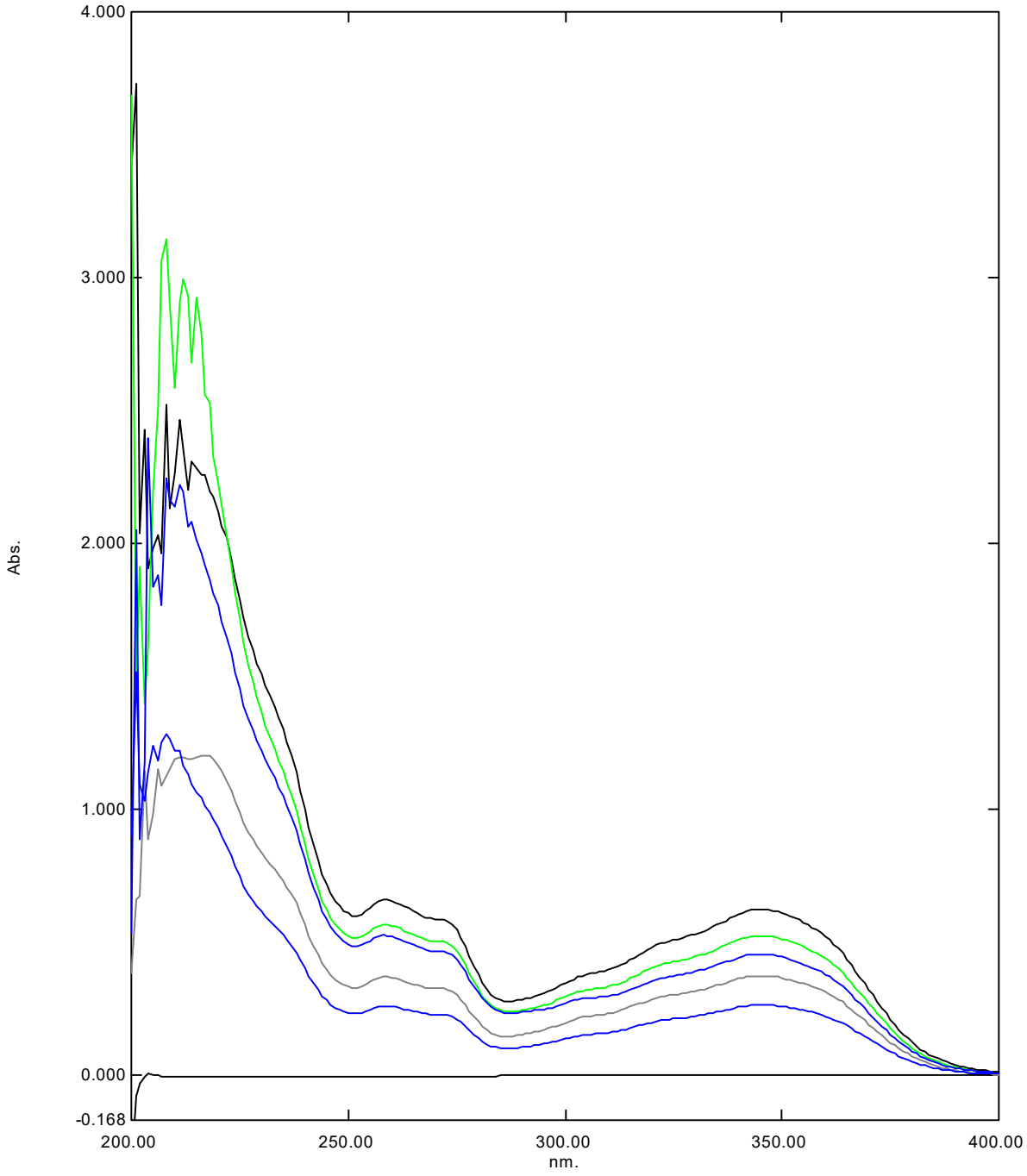
Try-1 Overlay:



Try-2:

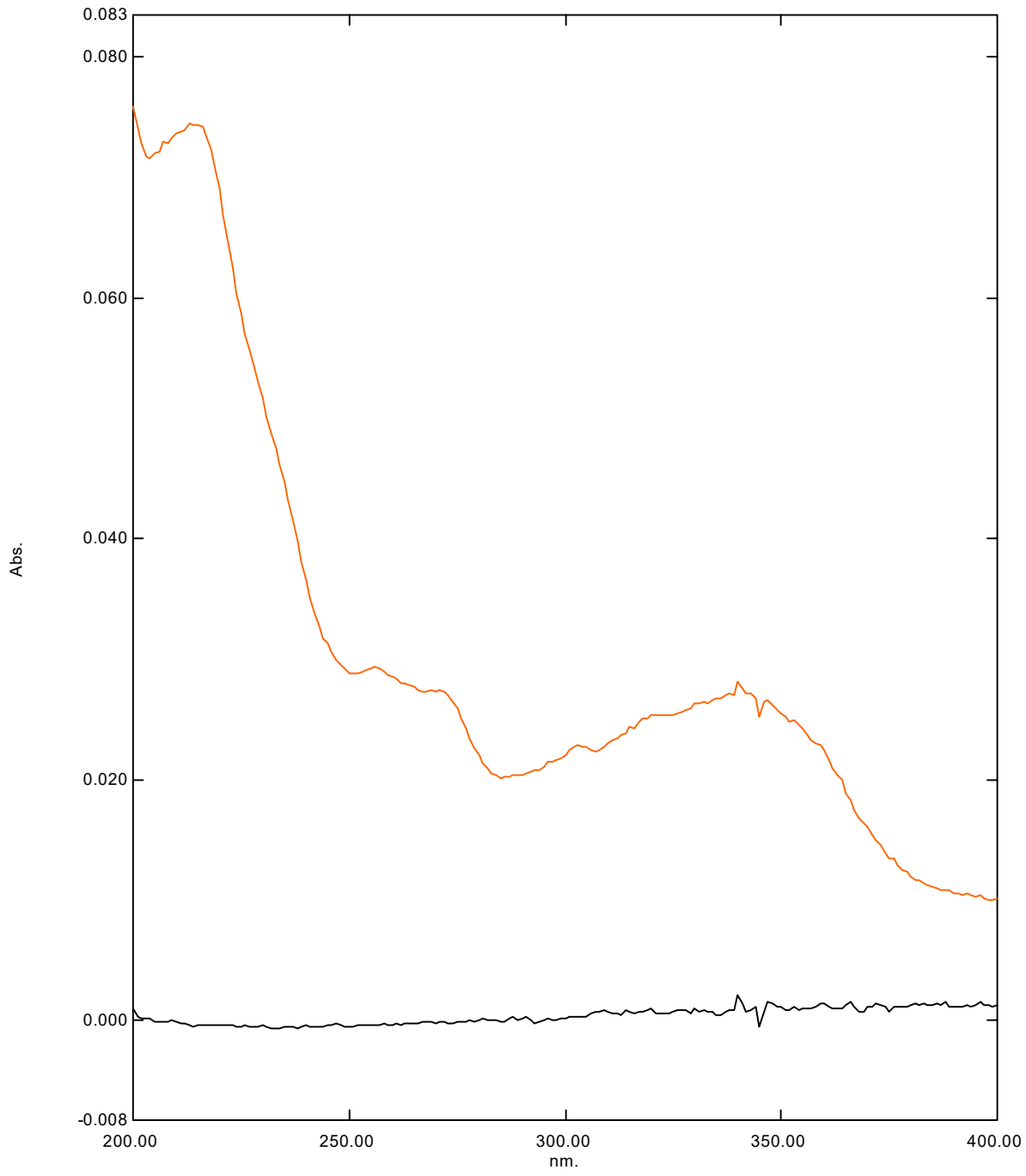

0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Absorbance
1
2
3
4
5
Concentration
Ethanol
Linear (Ethanol)

Try-2 Overlay:

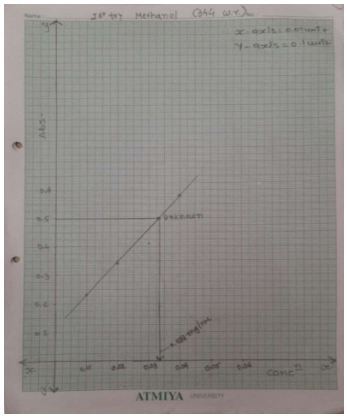


Water:

344 wavelength- 0.028 absorbance



Graph: **Methanol Try-1** **Calculation:**



0.2 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.033 mg

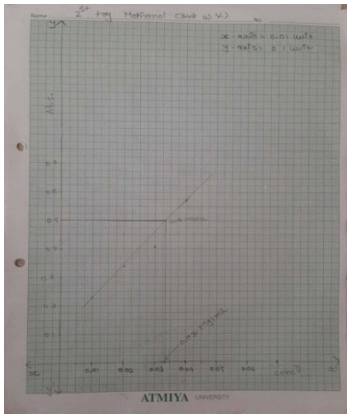
3 mL ⟶ ?

= 0.495 mg /3mL

- 0.165 mg/mL
- 16.5 mg/100mL

Result : 16.5 mg drug is soluble in 100 mL of Methanol

Methanol Try-2



0.2 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.031 mg

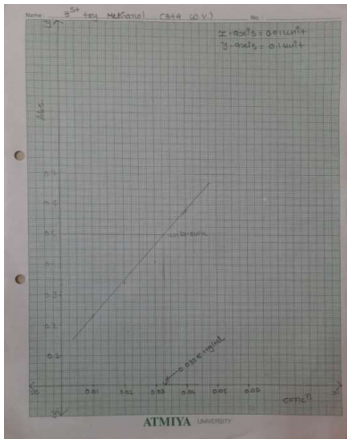
3 mL ⟶ ?

= 0.465 mg /3mL

- 0.155 mg/mL
- 15.5 mg/100mL

Result : 15.5 mg drug is soluble in 100 mL of Methanol

Graph: **Methanol Try-3** **Calculation:**



0.2 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.030 mg

3 mL ⟶ ?

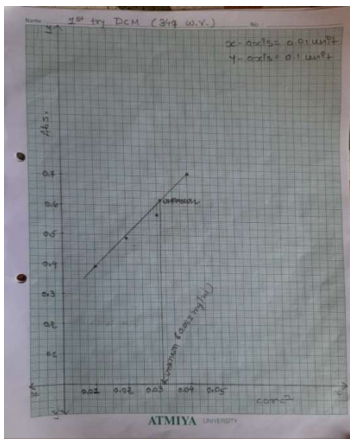
= 0.457 mg /3mL

- 0.152 mg/mL
- 15.2 mg/100mL

Result : 15.2 mg drug is soluble in 100 mL of Methanol

Conclusion : So from the average of above three results we can conclude that 15.7 mg drug is soluble in 100 mL Methanol.

DCM Try-1



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.031 mg

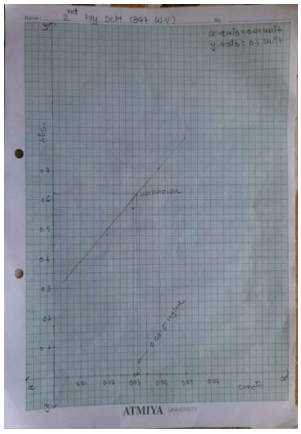
3 mL ⟶ ?

= 0.465 mg /3mL

- 0.155 mg/mL
- 15.5 mg/100mL

Result : 15.5 mg drug is soluble in 100 mL of DCM

Graph:



DCM Try-2

0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

Calculation:

0.2 mL ⟶ 0.0315 mg

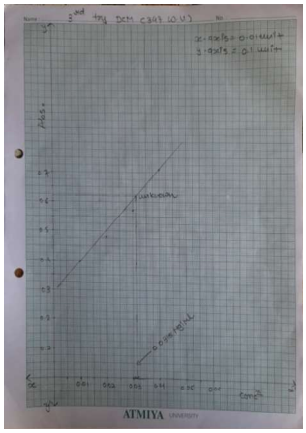
3 mL ⟶ ?

= 0.4725 mg /3mL

- 0.1575 mg/mL
- 15.75 mg/100mL

Result : 15.75 mg drug is soluble in 100 mL of DCM

DCM Try-3



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.0315 mg

3 mL ⟶ ?

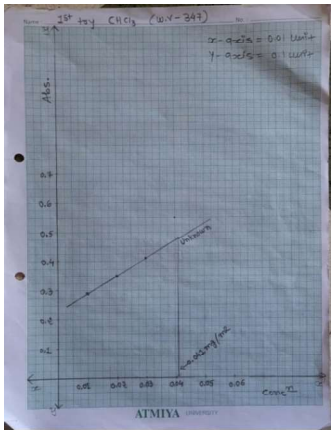
= 0.4725 mg /3mL

- 0.1575 mg/mL
- 15.75 mg/100mL

Result : 15.75 mg drug is soluble in 100 mL of DCM

Conclusion : So from the average of above three results we can conclude that 15.66 mg drug is soluble in 100 mL DCM.

Graph: **Chloroform Try-1** **Calculation:**



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.041 mg

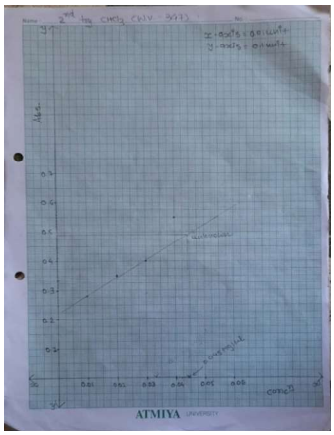
3 mL ⟶ ?

= 0.615 mg /3mL

- 0.205 mg/mL
- 20.5 mg/100mL

Result : 20.5 mg drug is soluble in 100 mL of Chloroform

Chloroform Try-2



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.045 mg

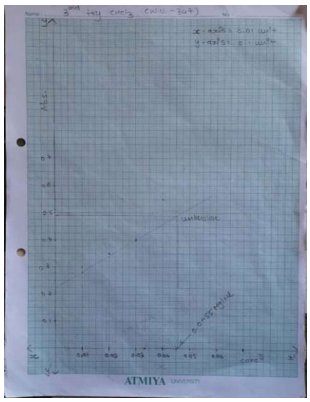
3 mL ⟶ ?

= 0.615 mg /3mL

- 0.205 mg/mL
- 20.5 mg/100mL

Result : 20.5 mg drug is soluble in 100 mL of Chloroform

Graph: **Chloroform Try-3** **Calculation:**



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.0455 mg

3 mL ⟶ ?

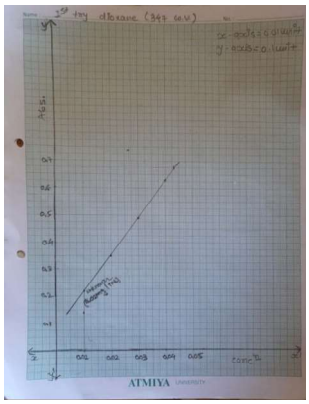
= 0.6825 mg /3mL

- 0.2275 mg/mL
- 22.75 mg/100mL

Result : 22.75 mg drug is soluble in 100 mL of Chloroform

Conclusion : So from the average of above three results we can conclude that 21.25 mg drug is soluble in 100 mL Chloroform.

Dioxane Try-1



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.01 mg

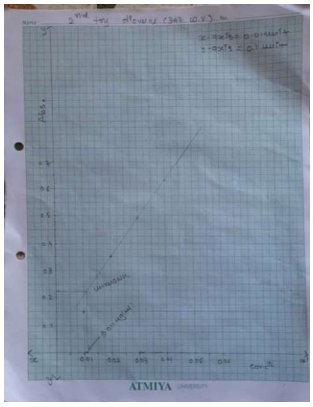
3 mL ⟶ ?

= 0.15 mg /3mL

- 0.05 mg/mL
- 5 mg/100mL

Result : 5 mg drug is soluble in 100 mL of Dioxane

Graph: **Dioxane Try-2** **Calculation:**



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.011 mg

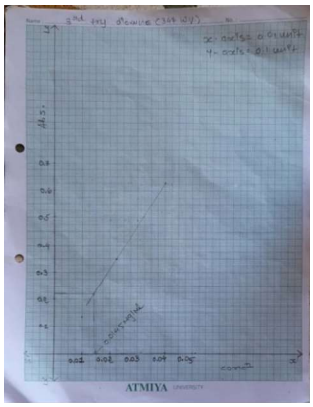
3 mL ⟶ ?

= 0.165 mg /3mL

- 0.055 mg/mL
- 5.5 mg/100mL

Result : 5.5 mg drug is soluble in 100 mL of Dioxane

Dioxane Try-3



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.0145 mg

3 mL ⟶ ?

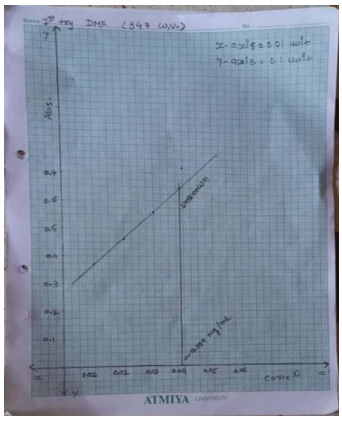
= 0.2175 mg /3mL

- 0.0725 mg/mL
- 7.25 mg/100mL

Result : 7.25 mg drug is soluble in 100 mL of Dioxane

Conclusion : So from the average of above three results we can conclude that 5.91 mg drug is soluble in 100 mL Dioxane.

Graph: **DMF Try-1** **Calculation:**



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.039 mg

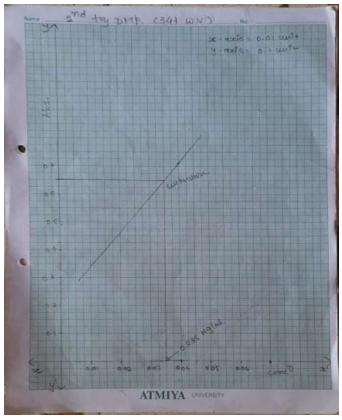
3 mL ⟶ ?

= 0.585 mg /3mL

- 0.195 mg/mL
- 19.5 mg/100mL

Result : 19.5 mg drug is soluble in 100 mL of DMF

DMF Try-2



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.0355 mg

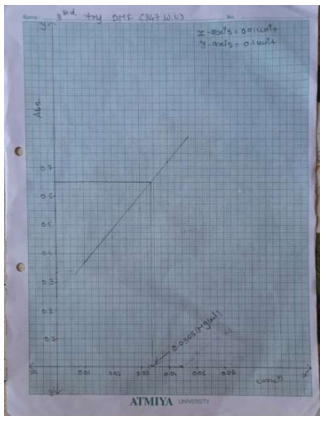
3 mL ⟶ ?

= 0525 mg /3mL

- 0.175 mg/mL
- 17.5 mg/100mL

Result : 17.5 mg drug is soluble in 100 mL of DMF

Graph: **DMF Try-3** **Calculation:**



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.0365 mg

3 mL ⟶ ?

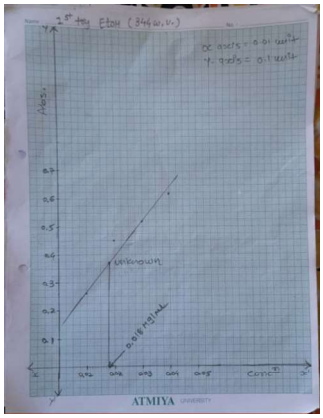
= 0.5475 mg /3mL

- 0.1825 mg/mL
- 18.25 mg/100mL

Result : 18.25 mg drug is soluble in 100 mL of DMF

Conclusion : So from the average of above three results we can conclude that 18.41 mg drug is soluble in 100 mL DMF.

Ethanol Try-1



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.018 mg

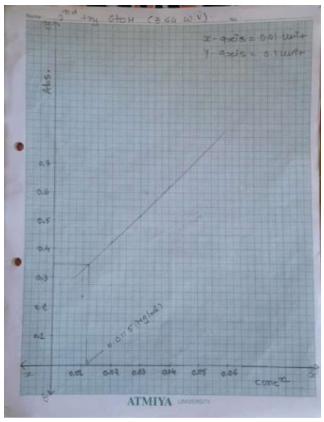
3 mL ⟶ ?

= 0.27 mg /3mL

- 0.09 mg/mL
- 9 mg/100mL

Result : 9 mg drug is soluble in 100 mL of Ethanol

Graph:



Ethanol Try-2

0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

Calculation:

0.2 mL ⟶ 0.0115 mg

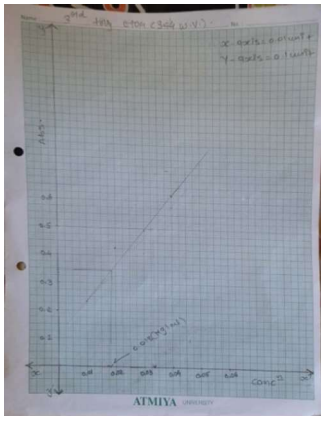
3 mL ⟶ ?

= 0.1725 mg /3mL

- 0.0575 mg/mL
- 5.75 mg/100mL

Result : 5.75 mg drug is soluble in 100 mL of Ethanol

Ethanol Try-3



0.2 ⟶ 10

↓

1 ⟶ 10

↓

1 ⟶ 10

↓

Reading

0.2 mL ⟶ 0.018 mg

3 mL ⟶ ?

= 0.27 mg /3mL

- 0.09 mg/mL
- 9 mg/100mL

Result : 9 mg drug is soluble in 100 mL of Ethanol

Conclusion : So from the average of above three results we can conclude that 7.91 mg drug is soluble in 100 mL DMF.

Result:

No.	Solvent	Solubility
1	Methanol	15.7 mg/100mL
2	DCM	15.66 mg/100mL
3	Chloroform	21.25 mg/100mL
4	Dioxane	5.91 mg/100mL
5	DMF	18.41 mg/100mL
6	Ethanol	7.91 mg/100mL
7	Water	Insoluble

- From the above result we conclude that solubility order of the drug is as follows :

- Chloroform > DMF > Methanol > DCM > Ethanol > Dioxane > Water

Section-3.2: DENSITY

The weight of solvents, pure solvents and solutions of organic compounds were measured by using gravity bottle. The density (ρ) was evaluated by using following equation.

$$\text{Density } (\rho) = \frac{\text{Weight of solvent with drug}}{\text{Weight of solvent without drug}}$$

- **GENERAL PROCEDURE:**

- For measuring the density of drug accurately weight 0.025gm, 0.050gm, 0.075gm and 0.10gm in vials with the help of electronic weight balance.
- Put all these four vials for stirring with rice needle for 15 minutes and make make upto 10ml with suitable solvent.
- Measure the weight of empty gravity bottle, weight of gravity bottle filled with particular solvent and weight gravity bottle filled with drug dissolved in solvent and note down the weight

- **NOTE:** The density was measured by gravity bottle with different concentration at room temperature.[40]

DIOXANE:

(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 10.054gm

(3) Weight of solvent with drug without gravity bottle =

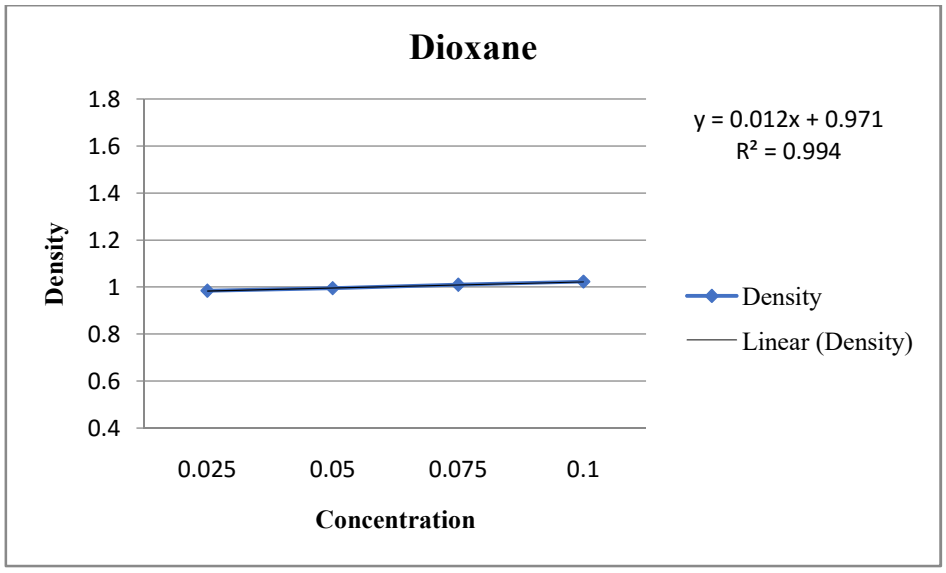
i. 0.025 = 09.901gm

ii. 0.050 = 10.003gm

iii. 0.075 = 10.155gm

iv. 0.100 = 10.285gm

CONCENTRATION	DENSITY
0.025	0.985
0.050	0.995
0.075	1.010
0.100	1.023



CHLOROFORM:

(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 09.998gm

(3) Weight of solvent with drug without gravity bottle =

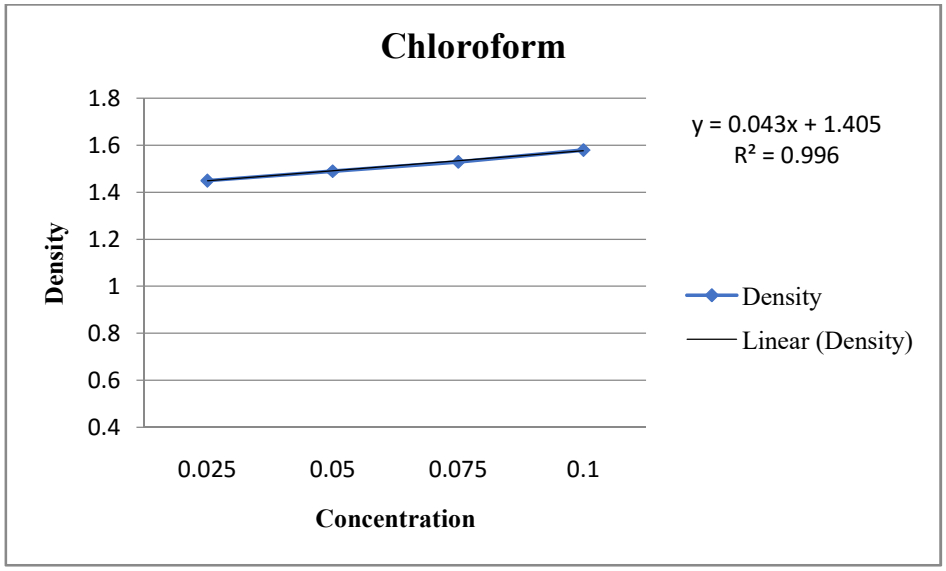
i. 0.025 = 14.535gm

ii. 0.050 = 14.921gm

iii. 0.075 = 15.333gm

iv. 0.100 = 15.790gm

CONCENTRATION	DENSITY
0.025	1.45
0.050	1.49
0.075	1.53
0.100	1.58



ETHANOL:

(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 08.036gm

(3) Weight of solvent with drug without gravity bottle =

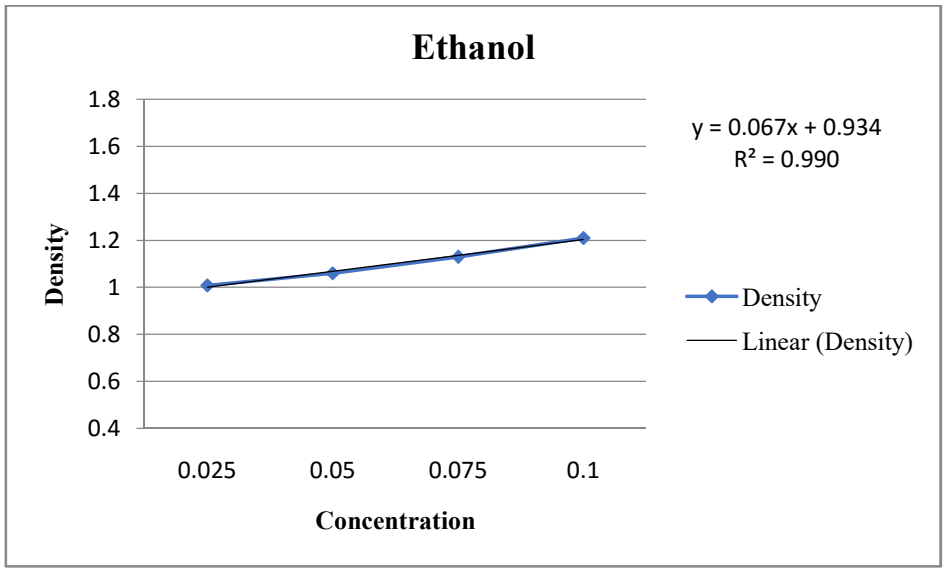
i. 0.025 = 8.113gm

ii. 0.050 = 8.518gm

iii. 0.075 = 9.160gm

iv. 0.100 = 9.720gm

CONCENTRATION	DENSITY
0.025	1.009
0.050	1.06
0.075	1.13
0.100	1.21



DICHLOROMETHANE:

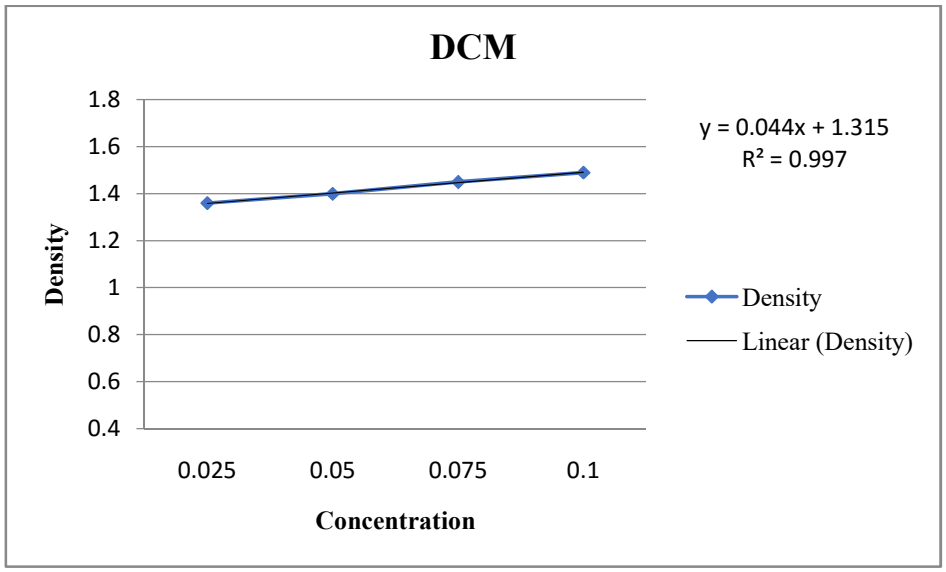
(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 13.124gm

(3) Weight of solvent with drug without gravity bottle =

i. 0.025 = 17.851gm
ii. 0.050 = 18.439gm
iii. 0.075 = 19.029gm
iv. 0.100 = 19.554gm

CONCENTRATION	DENSITY
0.025	1.360
0.050	1.404
0.075	1.450
0.100	1.49



METHANOL:

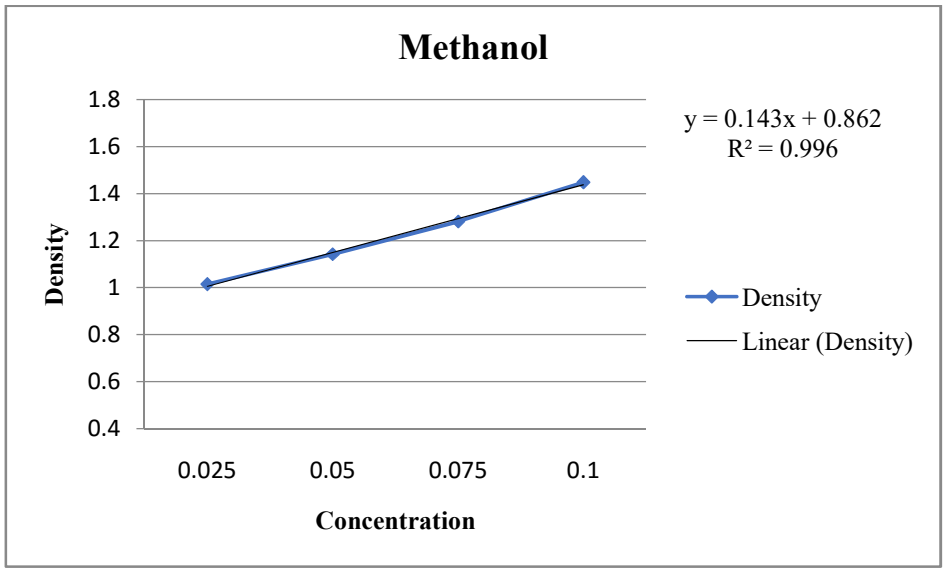
(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 7.936gm

(3) Weight of solvent with drug without gravity bottle =

i. 0.025 = 8.062gm
ii. 0.050 = 9.072gm
iii. 0.075 = 10.212gm
iv. 0.100 = 11.492gm

CONCENTRATION	DENSITY
0.025	1.015
0.050	1.143
0.075	1.282
0.100	1.448



DIMETHYLFORMAMIDE:

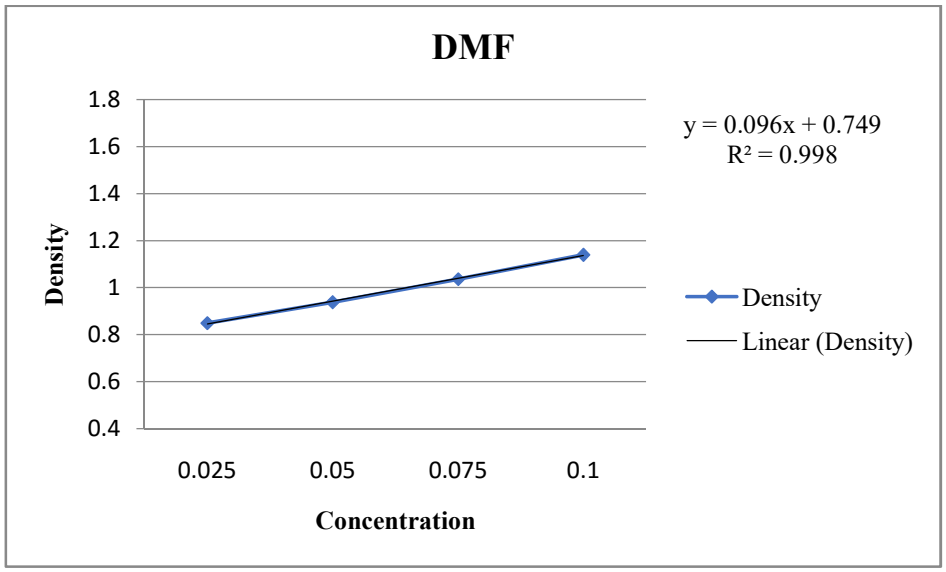
(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 9.536gm

(3) Weight of solvent with drug without gravity bottle =

i. 0.025 = 08.101gm
ii. 0.050 = 08.951gm
iii. 0.075 = 09.889gm
iv. 0.100 = 10.926gm

CONCENTRATION	DENSITY
0.025	0.850
0.050	0.938
0.075	1.037
0.100	1.140



WATER:

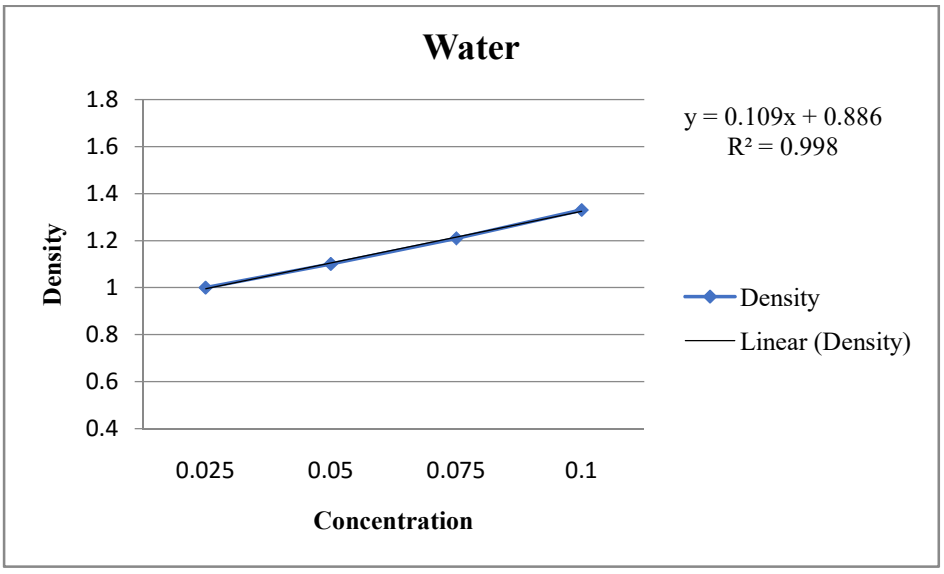
(1) Weight of empty gravity bottle = 12.076gm

(2) Weight of solvent without gravity bottle = 10.058gm

(3) Weight of solvent with drug without gravity bottle =

i. 0.025 = 10.076gm
ii. 0.050 = 11.077gm
iii. 0.075 = 12.178gm
iv. 0.100 = 13.388gm

CONCENTRATION	DENSITY
0.025	1.001
0.050	1.101
0.075	1.210
0.100	1.331



Result:

- From the above result we can conclude that, with increase in drug concentration density of each solvent increases.

Section-3.3: Viscosity

To determine the viscosity of solution, Ostwald viscometer was used, which obeys Stoke'slaw. The measured quantity of solvent was placed in the viscometer. The digital stopwatch with an accuracy of ± 0.01 second was used to determine flow time of solutions. [41] The viscosity of solutions were determined according to following equation:

$$V = \frac{dx \times dt}{dw \times tw}$$

Where,

dx=density of drug

dt = time

dw=density of water

dt = time taken by water

- For measuring the viscosity of drug, accurately weigh 0.025gm,0.050gm, 0.075gm and 0.100gm in 50ml beaker with the help of electronic weight balance.
- Add 30ml solvent in these 4 50ml beakers and stir it for 15 minutes on magnetic stirrer.
- Then carefully transfer the content of beaker into Ostwald's viscometer and measure the viscosity.
- Note down the results

Note: The viscosity was measured with different concentrations at room temperature.

Dioxane:

$$\frac{dx \times dt}{dw \times tw}$$

- 0.025gm:

dx (density of drug) =0.985

dt (time taken by drug) =93 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =0.995

dt (time taken by drug) =104 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.010

dt (time taken by drug) =116 seconds

dw(density of water)=1.21

dt(time taken by water)=71 seconds

- 0.1 gm:

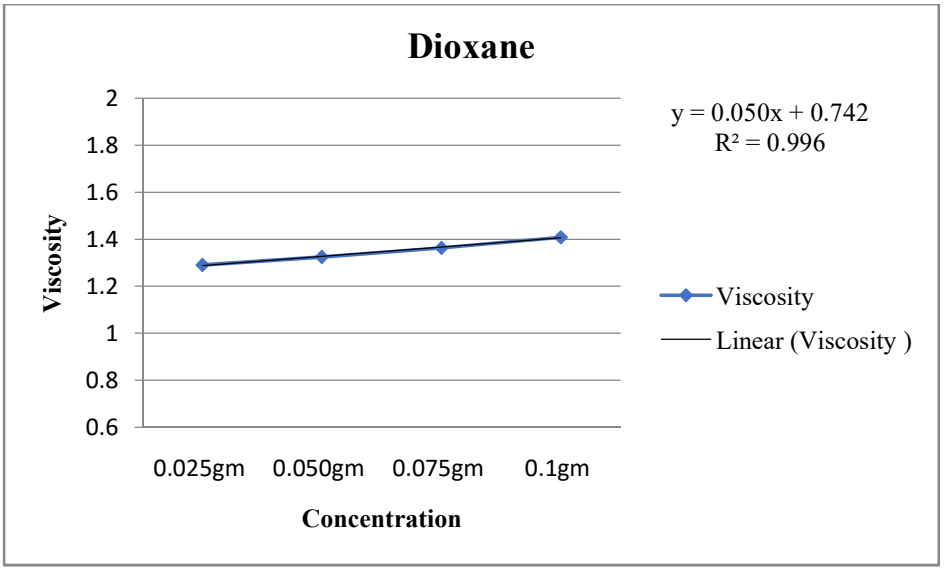
dx(density of drug)=1.023

dt(time taken by drug) =130 seconds

dw(density of water)=1.33

dt(time taken by water)=71 seconds

Concentration	Viscosity
0.025gm	1.2902
0.050gm	1.3249
0.075gm	1.3637
0.1gm	1.4082



Chloroform:

- 0.025gm:

dx (density of drug) =1.45

dt (time taken by drug) =39 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =1.49

dt (time taken by drug) =44 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.53

dt (time taken by drug) =50 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

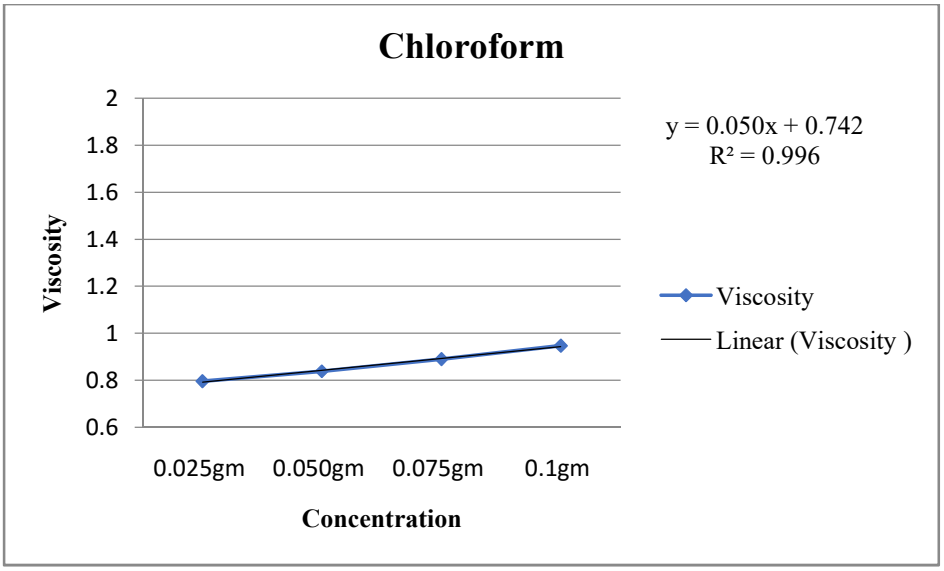
dx (density of drug) =1.57

dt (time taken by drug) =57 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	0.7964
0.050gm	0.8394
0.075gm	0.8904
0.1gm	0.9476



Ethanol:

- 0.025gm:

dx (density of drug) =1.009

dt (time taken by drug) =107 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =1.06

dt (time taken by drug) =114 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.13

dt (time taken by drug) =121 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

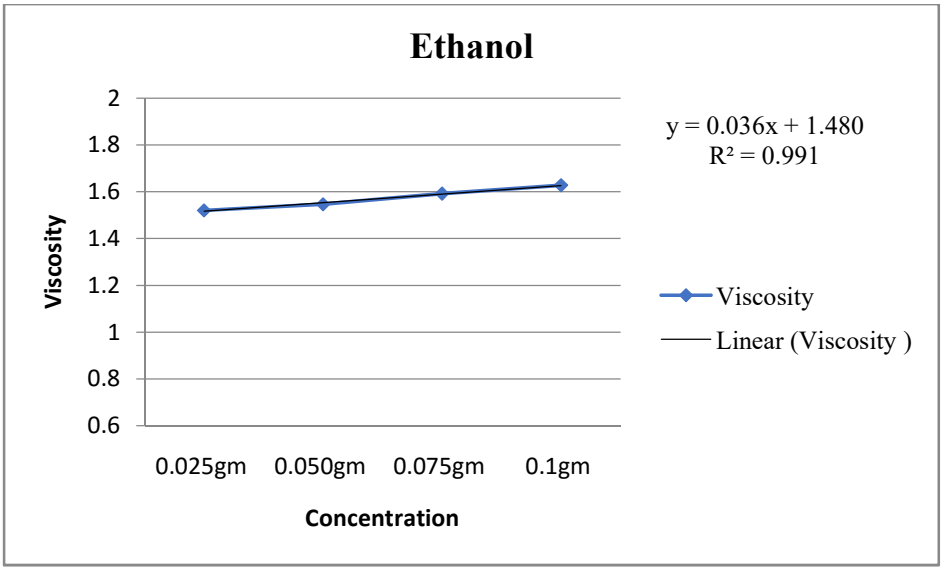
dx (density of drug) =1.21

dt (time taken by drug) =127 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	1.5206
0.050gm	1.5472
0.075gm	1.5915
0.1gm	1.6273



Dichloromethane:

- 0.025gm:

dx (density of drug) =1.36

dt (time taken by drug) =37 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =1.40

dt (time taken by drug) =40 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.45

dt (time taken by drug) =43 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

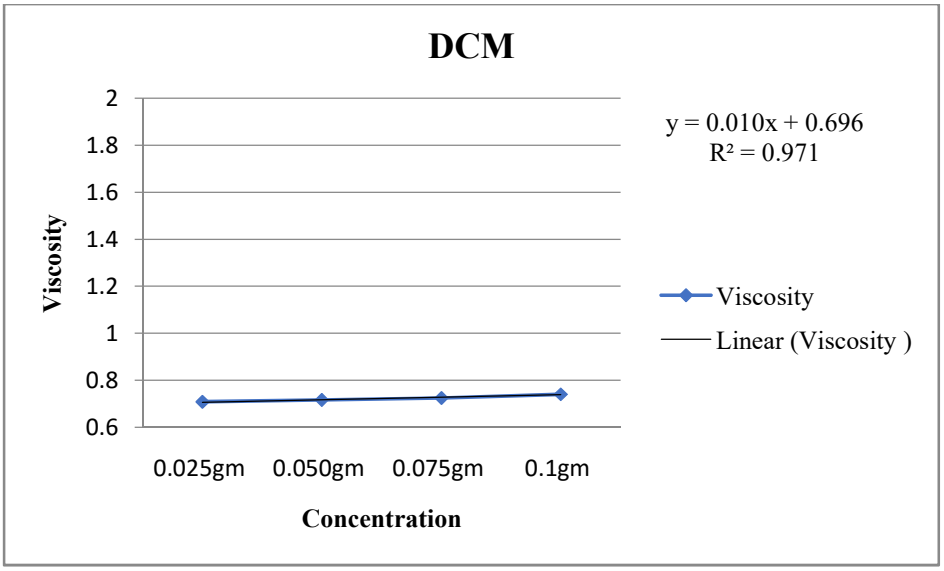
dx (density of drug) =1.49

dt (time taken by drug) =47 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	0.7087
0.050gm	0.7170
0.075gm	0.7257
0.1gm	0.7416



Methanol:

- 0.025gm:

dx (density of drug) =1.01

dt (time taken by drug) =61 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =1.14

dt (time taken by drug) =64 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.28

dt (time taken by drug) =67 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

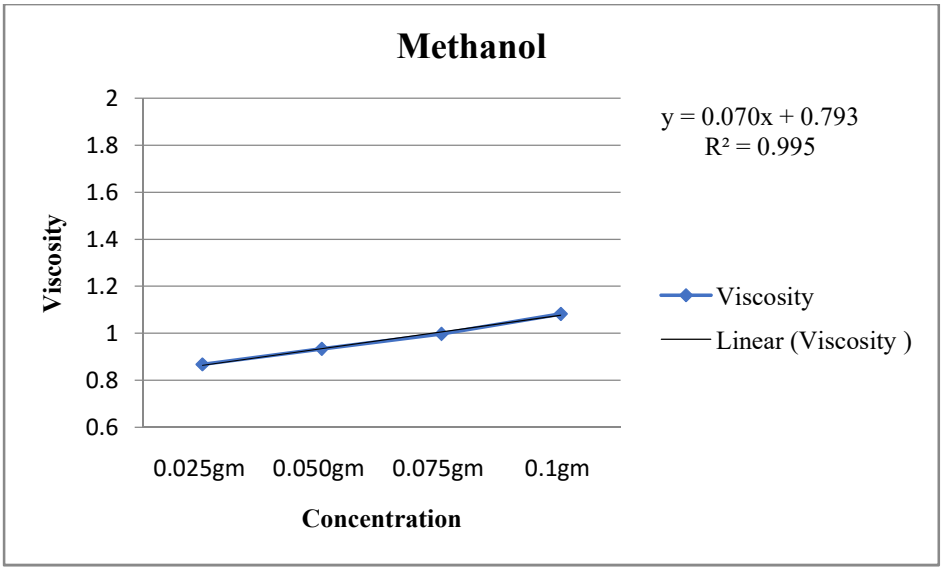
dx (density of drug) =1.44

dt (time taken by drug) =71 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	0.8677
0.050gm	0.9341
0.075gm	0.9982
0.1gm	1.0827



Dimethyl Formamide:

- 0.025gm:

dx (density of drug) =0.85

dt (time taken by drug) =77 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =0.938

dt (time taken by drug) =101 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.037

dt (time taken by drug) =127 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

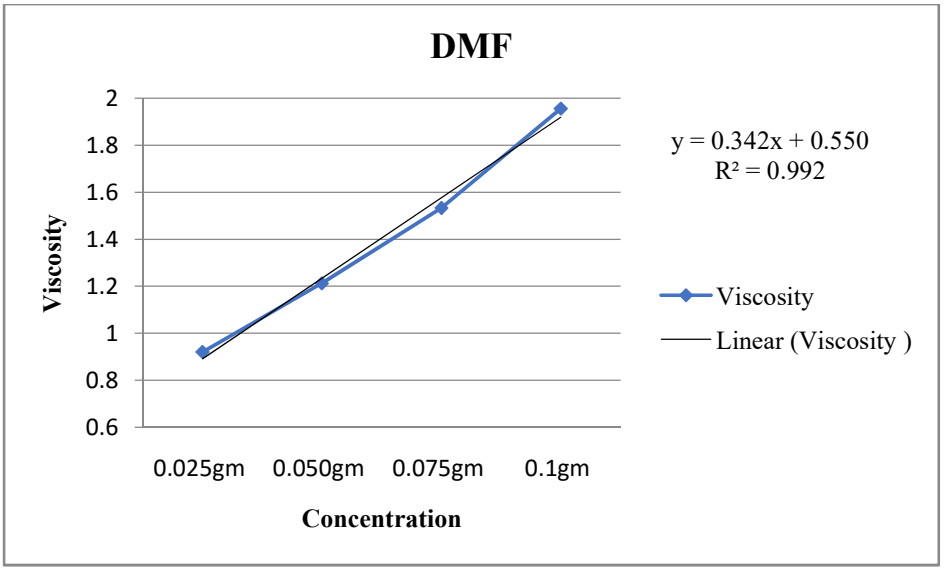
dx (density of drug) =1.14

dt (time taken by drug) =162 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	0.9218
0.050gm	1.2130
0.075gm	1.5329
0.1gm	1.9557



Water:

- 0.025gm:

dx (density of drug) =1.00

dt (time taken by drug) =76 seconds

dw (density of water) =1.00

dt (time taken by water) =71 seconds

- 0.050gm:

dx (density of drug) =1.10

dt (time taken by drug) =79 seconds

dw (density of water) =1.10

dt (time taken by water) =71 seconds

- 0.075gm:

dx (density of drug) =1.21

dt (time taken by drug) =83 seconds

dw (density of water) =1.21

dt (time taken by water) =71 seconds

- 0.1gm:

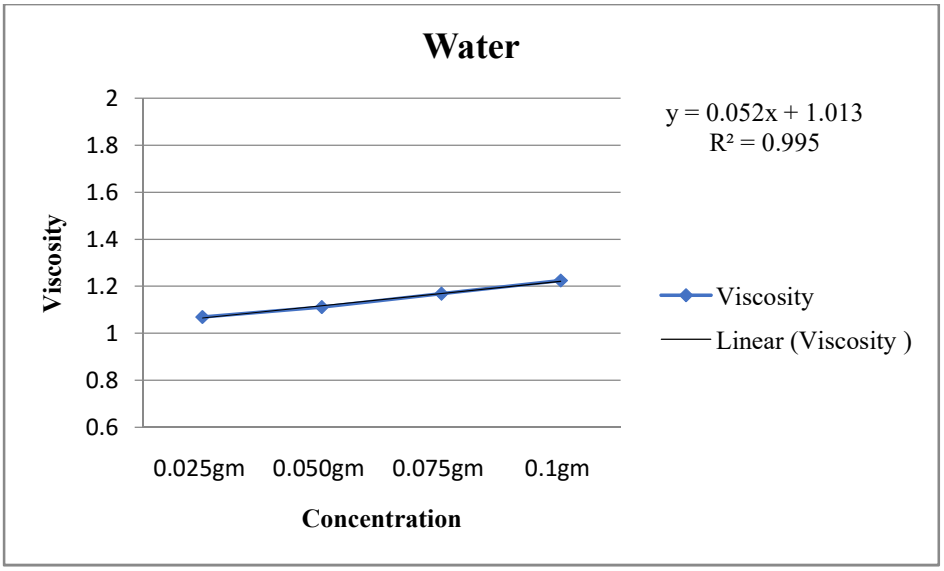
dx (density of drug) =1.33

dt (time taken by drug) =87 seconds

dw (density of water) =1.33

dt (time taken by water) =71 seconds

Concentration	Viscosity
0.025gm	1.070
0.050gm	1.112
0.075gm	1.1690
0.1gm	1.225



Result:

- From the above result we can conclude that, with increase in drug concentration viscosity of each solvent increases.

CONCLUSION:

The established pharmacological importance and the wide diversity of biological activities exhibited reported by benzodiazepine derivatives prompted us to carry out the present research work. As discussed previously the present research work focuses mainly on the synthesis of novel 1,5- benzodiazepine derivatives and the corresponding tricyclic compounds of 1,5-benzodiazepine derivatives of various types.

In future fluorescence activity of our novel benzodiazepine derivatives can be explored.

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“ASSESSING THE EFFECTIVENESS OF INDIAN MUTUAL FUND SCHEMES: A PERFORMANCE EVALUATION”

A THESIS

SUBMITTED BY

YASH RAKESHBHAI RATHOD

Date: 30/03/2024

MASTER OF COMMERCE

UNDER THE GUIDANCE OF

Ms. NISHITA THAKRAR

Assistant Professor

ATMIYA UNIVERSITY

SUBMITTED TO

Department of Commerce

Atmiya University

Rajkot-360001

Gujarat (India)

April-2024

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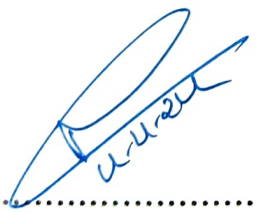

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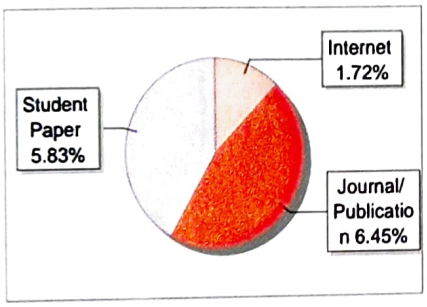

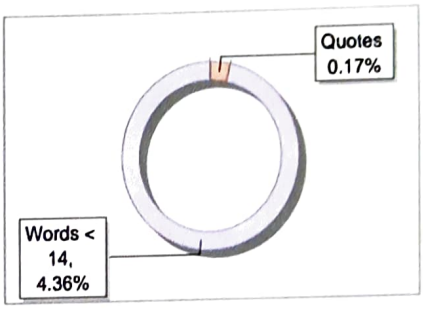

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To my family, especially my parents and my wife whose unwavering love and encouragement sustained me through the challenges of this journey, I extend my deepest gratitude. Your belief in me has been my greatest strength.

Lastly, to the countless unnamed individuals who, directly or indirectly, contributed to this Endeavour, your collective impact is not forgotten and is deeply appreciated

PREFACE

Any economy's financial landscape would be incomplete without mutual funds, which provide investors with a professionally managed, diversified portfolio. Mutual funds have grown significantly throughout time in India, where they are now a crucial part of the country's financial system. With so many mutual fund schemes available in India, investors now have a multitude of options to choose from, all of which promise different risk profiles and returns.

Selecting mutual fund schemes is a complicated process that is impacted by a wide range of variables, including past performance, fund management experience, fee ratios, and market conditions. Nevertheless, there is still a lack of thorough analyses that are especially suited to the Indian mutual fund industry, even in spite of the wealth of information and resources available on mutual funds.

By carrying out a comprehensive performance study of Indian mutual fund schemes, our research aims to close this gap. The purpose of this study is to evaluate these schemes' efficacy and offer investors useful information to support their investment choices. The analysis covers a wide range of mutual fund types, which accommodate the many investing choices that are common among investors. These categories include equity, debt, hybrid, and theme funds.

This study's path included careful data collecting, exacting statistical analysis, and critical interpretation of the results. It is the result of intensive work motivated by a desire to significantly advance knowledge about mutual fund performance in the Indian setting.

I would want to express my gratitude to mentors, industry professionals, and members of the academic community whose advice and assistance have been crucial to this research project. I would also want to thank the participants for voluntarily sharing their knowledge and experiences, which improved the caliber of the research.

My heartfelt wish is that this study would prove to be an invaluable tool for mutual fund industry participants, legislators, and investors, enabling them to make well-informed decisions and contributing to the expansion of the Indian financial markets.

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CHAPTER 1

INTRODUCTION OF MUTUAL FUND

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The four fundamental components of the Indian financial system were the securities sector, cash institutions, cash services, and cash instruments. The primary means of satisfying the Indian requirement is to present the capital market through offerings that are made competently. During the regular generation restructurings, the city market has experienced tremendous growth.

Alongside traditional banking, leasing and dealing capital, leasing, rent shopping, and other activities, there has been an increase in the capital market, securities, and cash services trade. The industries spared have been a major factor in promoting cash intervention inside the economy and inside the expansion of economic savings with progressive easing of economic policies.

It is necessary to execute the monetary sector in line with the expansion of the financial sector and second generation restructurings. For the most part, if investors' units of measurement are supplied, it has to work together to provide the capitalist with an affordable service. In this regard, non-depository financial institutions are essential to delivering better service to small investors.

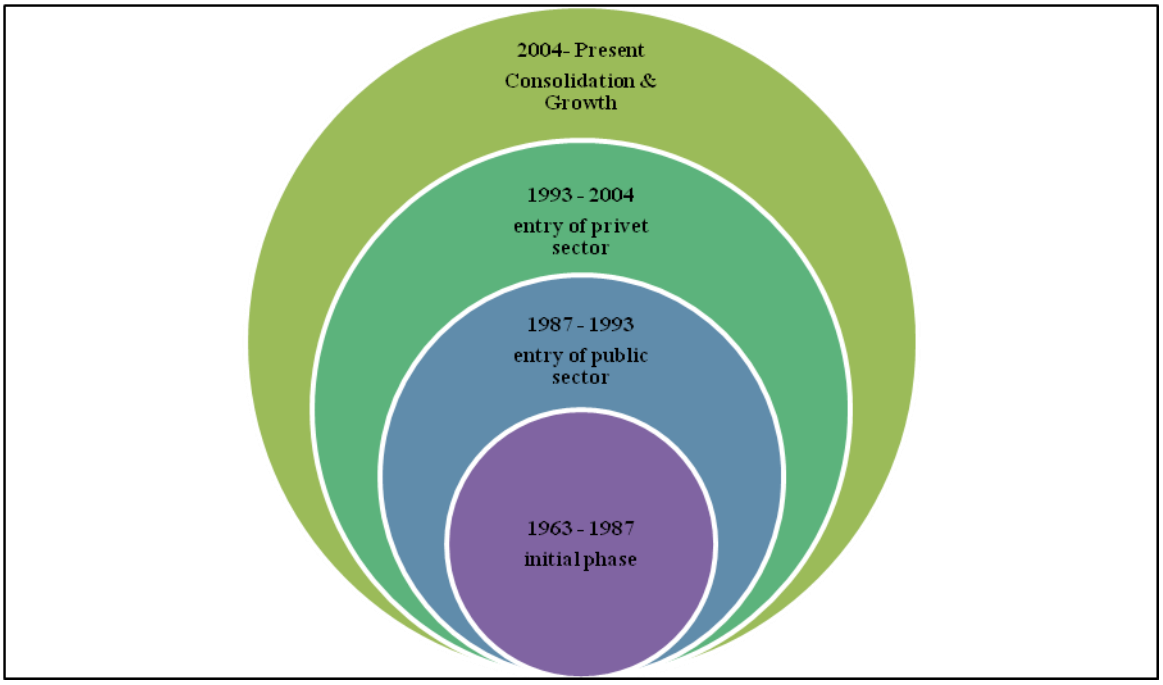
The principal aim of this study’s analysis is to examine how well-performing MF with five stars perform in respect to risk, return, and assets under management, value, and worth-to-earnings magnitude.

1.1 WHAT IS A MUTUAL FUND?

A mutual fund is characterized as a collection of cash or money that is backed by a trust and used to allocate the reserves of several depositors who have similar financial objectives, such as capital growth and surplus earnings. The money thus obtained is subsequently used to invest in capital market products like foreign exchange, debentures, and shares. Investors make cash investments and acquire units at the unit price, which we often refer to as NAV (Net Assets Value). The greatest invest for the soul is an asset management company, which gives you the opportunity to speculate in a broad variety of portfolio management, a sensible analysis team, and

professionally managed Indian stocks that are comparable to those in foreign markets. The fund manager's primary goal is to purchase certificates that have low value but have the potential to rise in the future, at which point the fund manager will sell the stock. Fund managers focus on risk; they make trade-offs to minimize risk and increase return through portfolio diversification.

1.2 HISTORY AND DEVELOPMENT OF MUTUAL FUND INDUSTRY



The Indian mutual fund industry began in 1963 when UTI was founded under the government and the RBI of India's suggestion. Four major eras have characterized the development of mutual funds.

The background of mutual funds begins in the nineteenth century, when they were 1st established in Europe, especially the United Kingdom. Robert Fleming founded the first investment company, Foreign and Colonial Investment Firm, in 1868 with the goal of managing the wealthiest segments of the European population by distributing their investments over a wide range of equities.

The Republic of India's investment firm industry began 1963 saw the establishment of the Indian UTI, which was the brainchild of the country's banking industry and government. In general, the background of mutual funds in Asian countries can be broadly split in a quarter periods.

A. First Phase: 1964-87

The UTI was established by a parliamentary act in 1963 (UTI). It was founded by the RBI, which also oversaw its regulatory and administrative operations. Following UTI's 1978 split from the RBI, the Industrial Development Bank of India (IDBI) took over as the new regulatory and administrative entity. The first UTI system was introduced in 1964 with the Unit System. By the end of 1988, UTI was managing assets valued at Rs. 6,700 crores.

B. **Second Phase : 1987-1993 (Entry Of Public Sector Funds)**

In 1987, non-UTI mutual funds were launched by public sector banks, General Insurance Corporation of India (GIC), and Life Insurance Corporation of India (LIC). The subsequent non-UTI mutual funds to be introduced were the PNB Mutual Fund (August 1989), Indian Bank Mutual Fund (November 1989), Bank of India (June 1990), Can Bank Mutual Fund (December 1987), Bank of Baroda Mutual Fund (October 1992), and SBI Mutual Fund (June 1987). LIC had established its mutual fund in June 1989, whilst GIC had done so in December 1990. By the end of 1993, the mutual fund industry was managing assets of Rs. 47,004 crores.

C. Third Phase : 1993-2003(Entry Of Private Sector Funds)

With the introduction of private sector funds in 1993, the Indian mutual fund market entered a new era by providing investors with additional fund family options. In 1993, the first mutual fund rule was created, requiring supervision and registration for all mutual funds except UTIs. The Kothari Pioneer, which has now merged with Franklin Templeton, was the first private sector mutual fund to be

registered in July 1993. The 1993 SEBI (Mutual Fund) statutes were replaced in 1996 with a more comprehensive and modern set of mutual fund regulations. Now that they are in force, the SEBI (Mutual Fund) Regulations of 1996 control the sector.

The number of mutual fund houses in India kept growing as more foreign mutual funds opened accounts there. In the industry, there were also a lot of mergers and acquisitions. As of the end of January 2003, there were 33 mutual funds with a total asset value of Rs. 1, 21,805 crores. With assets under administration of Rs. 44,541 crores, the Unit Trust of India was far ahead of rival mutual funds.

D. Fourth Phase : since February 2003

In February 2003, following the revocation of the UTI Act of 1963, UTI divided into two separate businesses. The first is the Specified Undertaking of the Unit Trust of India, which had assets under administration amounting to Rs. 29,835 crores as of the end of January 2003. These assets typically match the assets of certain other schemes, the US 64 plan, and assured return. With an administrator and rules set by the Indian government, the Specified Undertaking of UTI functions beyond the purview of mutual fund laws.

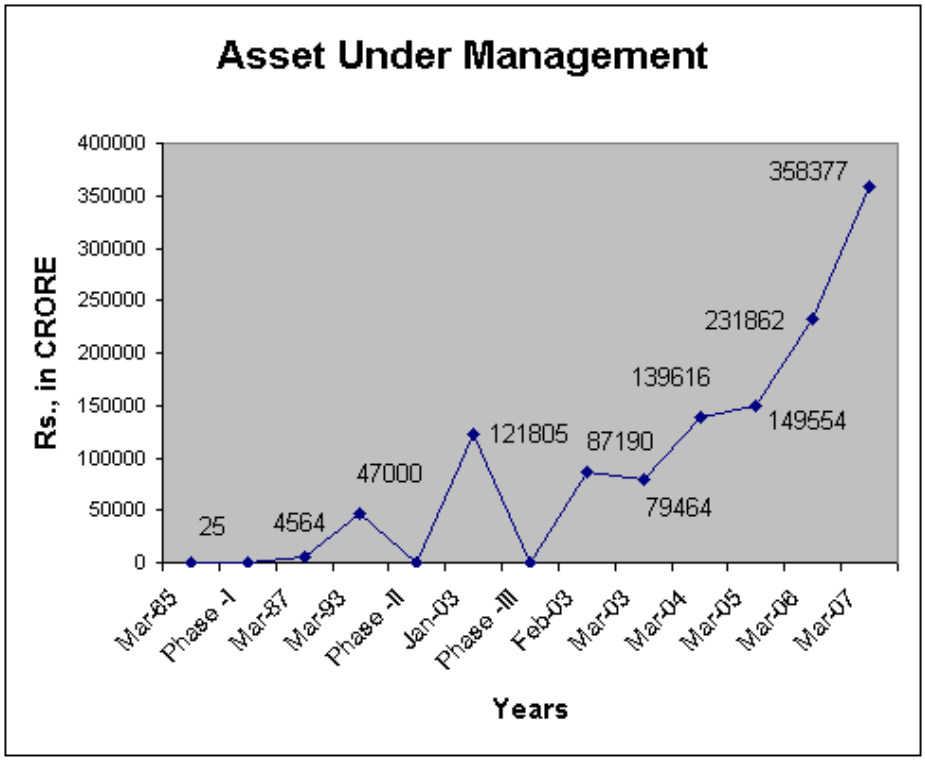


Chart: 1.1

(Source: goyalinvestments.com)

The UTI Mutual Fund, backed by LIC, SBI, PNB, and BOB, comes in second. It is registered with SEBI and runs in compliance with mutual fund regulations. Since the erstwhile UTI separated, the mutual fund industry—which in March 2000 had assets under management totaling over Rs. 76,000 crores—has entered a phase of expansion and consolidation. In addition, recent mergers of different private sector funds and the creation of a UTI Mutual Fund in compliance with SEBI Mutual Fund Regulations

1.3 WHY INVESTING IN MUTUAL FUND

Avoid concentrating all of your money in one location, as this has been shown to be a good speculative rule. Interest in common assets is beneficial for the following reasons. They assist in combining resources and throwing money into a large pile of offers from other groups. Accordingly, common assets can protect against a sharp decline in speculation value by investing in various organizations. A typical speculator lacks the resources and time necessary to adopt a professional mindset for

their endeavor. Here, skilled store managers attracted by shared assets make an enticing business decision for the advantage of financial experts in order to maximize asset utilization. Because speculators can sell the units on the open market or approach the common store to repurchase the units at net resource value depending on the type of plan, interest in shared assets is also more flexible. Financial advisors can profit from fee refunds by investing in different cost-saving schemes supported by these assets and approved by the law.

Due to the substantial quantity of investable assets, wage costs have been limited per head, reflecting higher net wages of investors.

A. Equity

Equity refers to what a company has to give. Common assets are eligible for the earnings, privileges, and awards declared by the organizations, apart from the benefit of capital appreciation resulting from appreciation appearing in the market appraisal of the held offers. This is undoubtedly reflected in the shared store units' valuation for the net resource estimate. The challenge in assigning value to resources stems from the remarkably capricious nature of the Indian capital markets, which can cause abrupt fluctuations in the offer prices.

B. Convertible Debentures

These bonds are issued by companies, and on a certain date, they are converted into value shares. As of that date, the aforementioned offerings carry the same benefits and risks as regular value shares.

C. Fixed Income Securities.

The speculators should profit at least something. Debentures, often known as securities, are financial instruments issued by private or public entities with fixed rates of interest that are payable on predetermined dates each year. Gilts are comparable instruments as well, but the key difference is that they are issued by the government, making them the safest option for speculating.

A portion of the money held by mutual funds is invested in fixed income instruments such as bonds, debentures, or gilts. The fundamental explanation is to have a set return to be able to protect, cover, and pay for ongoing costs.

D. Money Market Instruments

Financial instruments in the money individuals on the market are those who are issued or invested in for a little period of time, often a few days to a few months. Mutual funds offer a relatively modest yield on such instruments, notwithstanding this. Specifically, open-ended mutual funds allocate a portion of their assets to currency-trading instruments in order to maintain adequate liquidity for meeting current and unforeseen needs such as repurchases. Call money, T-bills, bills of trade, and commercial paper are among the items that are advertised on part of the currency. In summary, common assets serve as intermediaries in budgeting by facilitating communication between small-scale financial professionals and the money market. Shared assets act as middlemen in the financial system by combining the little reserve money of several speculators and investing them in securities on the capital market, where they earn an income. Financial experts receive the winnings as a percentage of return, and they again set aside a portion to reinvest in common assets.

1.4 THE JOURNEY OF MUTUAL FUNDS IN INDIA

1963: India's First Mutual Funds were established in 1963-The Indian government formed UTI in 1963. It was the first mutual fund in the country designed to encourage individual savings and investment.

1987: Introduction Of Mutual Fund Investments From The Private Sector- UTI's monopoly was broken by mutual funds like SBI , can bank and LIC mutual fund.

1991: Economic Liberalization-The Indian economy, particularly the financial sector, benefited from economic changes that were put into place in 1991. In this time, investors became increasingly interested in mutual funds as diverse investment options.

1993: SEBI Regulation-The SEBI Mutual Fund Regulations were implemented in 1993 following the enactment of the Securities and Exchange Board of India (SEBI) Act in 1992. This placed mutual funds under regulatory control, guaranteeing transparency and investor protection.

2000: Growth Phase-With the launch of cutting-edge products and a rise in retail investor engagement, the mutual fund sector saw tremendous expansion in the 2000s.

2008: Global Financial Crisis- The 2008 global financial crisis caused market volatility and redemption pressure, This momentarily harmed India's mutual fund industry.

2010: Growth and Innovation-With the launch of exchange-traded funds (ETFs), systematic investment plans (SIPs), and other investor-friendly programs, the mutual fund sector continued to grow and develop in the 2010s.

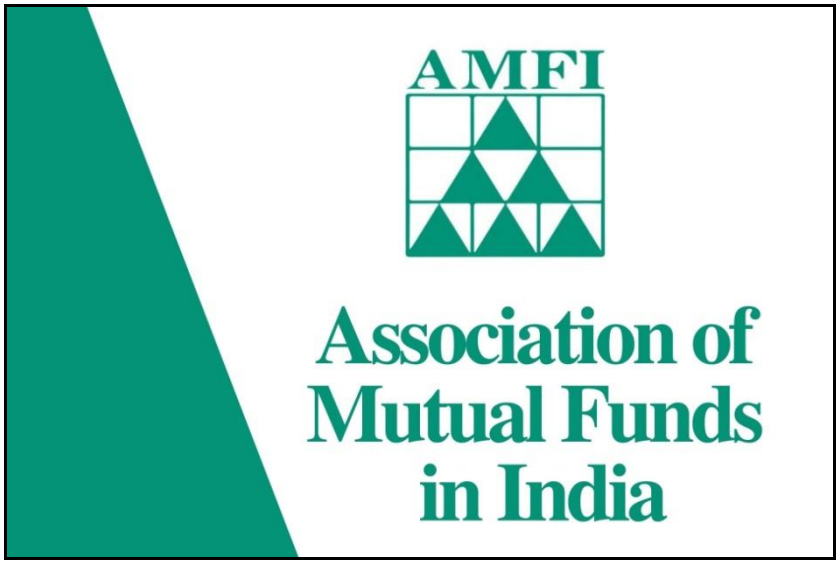
2014: SEBI Reforms-In an effort to improve transparency and investor friendliness, SEBI implemented a number of reforms. Among these reforms were transparency requirements, expense ratio reductions, and the reclassification and streamlining of mutual fund schemes.

2016: Demonetization- The 2016 demonetization campaign affected mutual funds in a diversity of ways. Due to increased formalization of savings, it resulted in a spike in inflows but also presented short-term liquidity issues for the sector.

2020: COVID-19 epidemic-The epidemic caused volatility in the world's financial markets, especially those in India. But for many individuals looking for professional portfolio management and diversification, mutual funds remained their go-to investing option.

Over this trip, industry has changed dramatically, with a wide selection of products available to suit varying risk tolerances and investing goals. Thanks to legislative actions and technical developments, the industry has also seen a rise in investor knowledge and involvement

1.5 ROLE OF AMFI (ASSOCIATION MUTUAL FUND IN INDIA)



(Source: tradebrains.com)

The AMFI is eager to elevate the mutual fund industry in India along skillful, virtuous, and moral lines. It also aims to uphold and improve standards in all relevant domains, safeguarding and advancing the interests of mutual funds

and their unit holders. August 22, 1995 saw the non-profit organization AMFI, the association of all registered quality management firms in the Republic of India that is registered with SEBI, is incorporated. All forty-five asset management companies that are currently registered with SEBI are members of the organization

- **Objectives:**

1. To establish and uphold the highest moral & professional standards among AMCs.

2. To assist and promote members of the Asset Management Company's activities in adopting a code of conduct and best practices for business, as well as quality management, in cooperation with entities associated with or engaged in the capital markets.

3. To collaborate with and represent the SEBI in all matters pertaining to the mutual fund industry.

4. To protect unit holders' and investors' interests.

5. To start a nationwide capitalist awareness campaign aimed at promoting truthful understanding of the mutual fund concept and trade.

6. To spread knowledge about the activities of asset management companies and to carry out independent and collaborative research and analysis.

7. To enforce distributor behavior regulations and disciplinary measures (ARN cancellation) for Guidelines for Behavior infractions.

1.6 INDIAN MUTUAL FUND INDUSTRY GROWTH:

The mutual fund business in India has experienced notable expansion in the past few years, mostly due to favorable regulatory reforms, greater retail investor involvement, and increased investor knowledge. A diverse portfolio overseen by qualified fund managers is what makes mutual funds an alluring investment choice for investors.

An array of important elements has fostered the expansion of the mutual fund sector in India:

1. Growing Investor Awareness: As investors become more financially literate and knowledgeable, their interest in mutual funds as a tool for reaching financial objectives has grown.

2. Regulatory Reforms: Investor confidence in mutual funds has increased as a result of regulatory changes like the Goods and Services Tax (GST), the Real Estate Regulatory Authority (RERA), and the Securities and Exchange Board of India's (SEBI) efforts to improve transparency and investor protection.

3. Technology Adoption: As a result of the widespread use of fetch and digital platforms, investors are now more likely to access and invest in mutual funds, which have improved investor involvement.

4. Systematic financial Plans (SIPs): SIPs are a popular financial instrument that encourages disciplined investing and long-term wealth growth by enabling individuals to make small, regular investments.

5. Market Performance: More investors have been drawn in by favourable market circumstances and profitable mutual fund investments, particularly during times of turbulence in other asset classes.

6. Broadening Distribution Network: To attract a wider range of investors, mutual fund companies have been reaching out to smaller towns and rural areas through the expansion of their distribution networks.

All things considered, the Indian mutual fund market is expected to grow further due to favorable demographics, rising financial inclusion, and continuous

initiatives by industry players and regulators to improve investor protection and transparency.

1.7 MUTUAL FUND & SEBI REGULATION:

The Securities and Exchange Board of India (SEBI) is principally responsible for overseeing mutual fund regulation in India. The Securities and Exchange Board of India Act, 1992 and the Securities Contracts (Regulation) Act, 1956 serve as the main foundations for the regulatory framework that governs mutual funds in India. On the other hand, SEBI has released a number of rules and directives that are especially related to mutual fund regulation.

An outline of SEBI rules and the regulatory environment in India concerning mutual funds is provided below:

1. SEBI Act, 1992: This legislation created SEBI as India's securities market regulator. It gives SEBI the authority to control and monitor different market players, including mutual funds.

2. Securities Contracts (Regulation) Act, 1956: This law establishes the guidelines by which securities contracts are governed in India. It establishes guidelines for the listing of securities, stock exchange regulation, and regulation of other intermediaries, such as mutual funds.

3. SEBI (Mutual Funds) Regulations, 1996: These rules were created expressly to regulate mutual funds in India in accordance with the SEBI Act, 1992. Among the important clauses in these regulations are:

- Mutual fund registration with SEBI: Any organization wishing to conduct business in India as a mutual fund must register with SEBI.

- Investment restrictions: In order to maintain responsible investment practices and safeguard investors' interests, SEBI oversees the mutual fund industry's investment operations. These rules put restrictions on the distribution of assets, the concentration of investments, etc.

• Disclosure requirements: Investors in mutual funds must be informed of important details about their schemes, including investing objectives, risk considerations, fees and charges, performance history, etc.

• Advertising code: To guarantee that ads for mutual fund schemes are truthful, equitable, and not deceptive, SEBI has established rules.

• Regulations governing asset management companies (AMCs): SEBI oversees the operations of AMCs, which look after mutual funds. It outlines the requirements for AMC eligibility, roles and responsibilities, and conduct code.

• Regulations pertaining to trustees: These regulations also address the function and duties of mutual fund trustees, including their qualifications, duties to investors, and measures to preserve investors' interests.

• Valuation norms: In order to guarantee fair and accurate valuation, which is essential for calculating the Net Asset Value (NAV) of mutual fund units, SEBI establishes rules for the valuation of mutual fund assets.

4. SEBI Circulars and Guidelines: In addition to the laws, SEBI periodically publishes notifications, circulars, and guidelines to offer more information and updates on several facets of mutual fund regulation. These could address things like corporate governance, risk management, investor protection strategies, etc.

5. Mutual Fund Intermediaries Code of Conduct: In order to guarantee honest and moral distribution procedures, SEBI has also established a code of conduct for intermediaries engaged in the marketing and distribution of mutual fund products.

All things considered, SEBI is essential to the regulation and oversight of the mutual fund sector in India since it upholds the integrity of the market, investor protection, and transparency. This regulatory framework is anchored by the SEBI (Mutual Funds) Regulations, 1996, as well as other pertinent guidelines and circulars.

1.7.1 LAUNCHING OF A SCHEME

i. Before a plan is launched, a copy of the offer documents needs to be approved by the trustees and submitted to SEBI.
ii. A memorandum with important details regarding the project must be attached to each application form for units of the scheme.
iii. The offer document needs to contain appropriate information to enable the investors to make educated investments decisions.
iv. Within seven days of the issue date, SEBI must receive submissions of all scheme ads.
v. The advertisements for a program should to make clear its investing purpose.
vi. No false information, erroneous statement, or opinion should be included in the offer documents or marketing.
vii. With the exception of equity-linked savings plans, all mutual fund schemes should have an initial offering term of no more than 45 days.
viii. Information that relies on assumptions for accuracy cannot be included in ads.
ix. A comparison of two plans cannot be used in an advertisement unless the schemes are comparable and all pertinent information is provided.
x. The names of the fund's trustees, sponsor, and AMC must appear on all advertisements.
xi. The risk factors must be disclosed in all marketing.
xii. All advertising must state that there is market risk associated with investing in mutual funds and that there is no guarantee that the fund's goals will be met.
xiii. No advertising claiming that a program has reached capacity or is oversubscribed may be published while it is still open for subscription.

1.8 A TYPE OF MULTIPLE FUND SCHEMES

There is a large range of schemes available to meet investor demands, including expectations for return and risk tolerance, among other things. Below is a summary of the several kinds of schemes that are now in use in the industry:

1. According To the Structure

a) Open-Ended Plans
b) Close-Ended Plans
c) Time-Based Plans

2. by Purpose of Investment

a) Diversified, Growth, and Equity Schemes
b) Income and Debt Plans
c) Balancing Plans
d) Plans for Money Markets

3. Advanced Schemes

a) Tax-saving plans (ELSS, or Equity Linked Savings Plan)
b) Financial Trusts
c) Investment Trusts
d) Classification by Sector
e) ETFs or exchange-traded funds
f) Exchange-traded funds linked to gold (GETFs)
g) FOFs

1.8.1. According To the Structure

A) Open-Ended Schemes

There is no standard maturity date for these plans. These plans are continuously available for subscription and purchasing. Units are easily purchased and sold by investors at Net Asset Value (NAV)-related prices, which are announced every day. Liquidity is the main characteristic of open-ended plans. Comparatively speaking, these programs have more liquidity. Such schemes must include

investments in their portfolio mix that are actively traded on the market. Because withdrawals are always a possibility, managing these kinds of funds gets increasingly laborious as Managers risk missing out on good opportunities because they must always have a large amount of cash on hand, which implies idle cash.

B) Close-Ended Schemes

Closed-ended programmers have a predetermined maturation period, such five or seven years. When the scheme first launches, subscriptions to the fund are only accepted for a brief period of time. Following their participation in the plan during its initial public offering, investors have the option to buy or sell the scheme's units on the stock exchanges where they are listed. Supply and demand, unit holders' expectations, and other market factors might cause the market price at the stock exchange to deviate from the scheme's net asset value. Certain closed-ended funds provide investors with an exit strategy by enabling them to sell their units back to the mutual fund on a regular basis at prices linked to NAV. Investors are required by SEBI requirements to have access to a minimum of one of the two exit options, which are stock exchange listing or repurchase facilities.

C) Time-Based Plans

These incorporate elements of both closed- and open-ended systems. They might be offered NAV-related prices for purchase or redemption at predefined intervals, or they could be traded on the stock exchange.

1.8.2. by Purpose of Investment

Depending on the investment goal, a plan may also be categorized as a balanced, income, or growth scheme. These plans can be among the previously mentioned open-ended or closed-ended plans. These schemes can be broadly categorized as follows:

A) Diversified, Growth, and Equity Schemes

Growth funds seek to generate medium- to long-term capital appreciation. These schemes typically place a large portion of their corpus in stocks and are prepared to accept a short-term value fall in exchange for a potential future appreciation. These funds carry a fair amount of risk. These programs offer many choices to the Investors can select an option according on their interests, and they appreciate capital appreciation and dividend options, in addition to. The option must be specified by the investors on the application form. Investors using mutual funds can also modify their selections at a later time. Growth schemes are a fantastic option for investors who want to invest for long-term growth and appreciation.

B) Income and Debt Plans

Providing investors with a steady income stream is the aim of income funds. Typical investments made by these programmers in fixed income securities include bonds, corporate debentures, government securities, and money market instruments. These funds carry less risk than equity plans. The equities market's changes have no effect on these funds. But there are also few chances for capital growth in these products. Debt-oriented schemes are suitable for investors who require a supplementary income to augment their earnings, as well as for retirees and other individuals who require capital stability and consistent income.0

C) Balancing Plans

Balanced funds aim to give investors both growth and steady income since they invest in both stocks and fixed income assets in the amounts indicated in their offer documents. Usually, they invest 60% of their money in debt instruments and 40% in stocks. These funds are also impacted by fluctuations in share values in the stock market. The NAVs of these funds are likely to be less volatile than those of pure equity funds. These should be taken into consideration by those looking for moderate growth.

D) Plans for Money Markets

These funds, which are also income funds, aim to provide capital preservation, quick liquidity, and moderate income. Only short-term, safer securities including government securities, commercial paper, certificates of deposit, treasury bills, and interbank call money are invested in these schemes. The current market interest rates may have an impact on the returns on these plans. These funds are available to both individual and corporate investors as a short-term solution for storing surplus capital.

1.8.3. Advanced Schemes

A) Tax-saving plans (ELSS, or Equity Linked Savings Plan)

These plans encourage long-term investments in stocks through mutual funds and provide investors with tax incentives under periodically mandated tax laws. These programs are advantageous for investors searching for tax breaks.

B) Financial Trusts

These funds exclusively make investments in government bonds. There is no chance that a government security will fail. The NAVs of these schemes fluctuate due to changes in interest rates and other economic reasons, just like income- or debt-oriented schemes do.

C) Investment Trusts

Index funds, such as the BSE Sensitive index, S&P NSE 50 index (Nifty), etc., duplicate the portfolio of a certain index. These schemes allocate investments to equities based on the same weighting as an index. Because of certain elements referred to as "tracking error" in technical terminology, the NAVs of such schemes would rise or fall in accordance with the rise or fall in the index, though not precisely by the same amount. In this regard, the mutual fund scheme's offer document contains the necessary disclosures.

D) Classification by Sector

These are the schemes that invest exclusively in the securities of the companies or sectors included in the offer documents, such as software, pharmaceuticals, FMCG (fast-moving consumer goods), petroleum stocks, etc. The performance of the corresponding sectors and industries affects the returns in these funds. In comparison to diversified funds, these funds carry greater risk even though they may produce larger returns. Investors must monitor those sectors' and industries' performance and withdraw from their investments when the time is right.

E) ETFs or exchange-traded funds

An exchange-traded fund (ETF) is a collection of securities that mimics the makeup of the index, such as the BSE Sensex, CNX Bank Index, CNX PSU Bank Index, S&P CNX Nifty, etc. The net asset value of the underlying stocks that an ETF represents determines its trading value. It is comparable to stocks it can be bought or sale in real time during market hours. Benchmark Nifty Bees, the country's first exchange-traded fund (ETF), became live for subscriptions on December 12, 2001, and it was launched on the NSE on January 8, 2002.

F) Exchange-traded funds linked to gold (GETFs)

A novel, affordable, and safe alternative for investors to access the gold market is through Gold Exchange Traded Funds. By purchasing and selling units on stock exchanges, investors are able to participate in the gold bullion market through gold exchange-traded funds (ETFs) without having to physically purchase gold. Benchmark GETF, the country's first Gold ETF, went up for subscriptions on February 15, 2007, and on April 17, 2007, it was listed on the NSE.

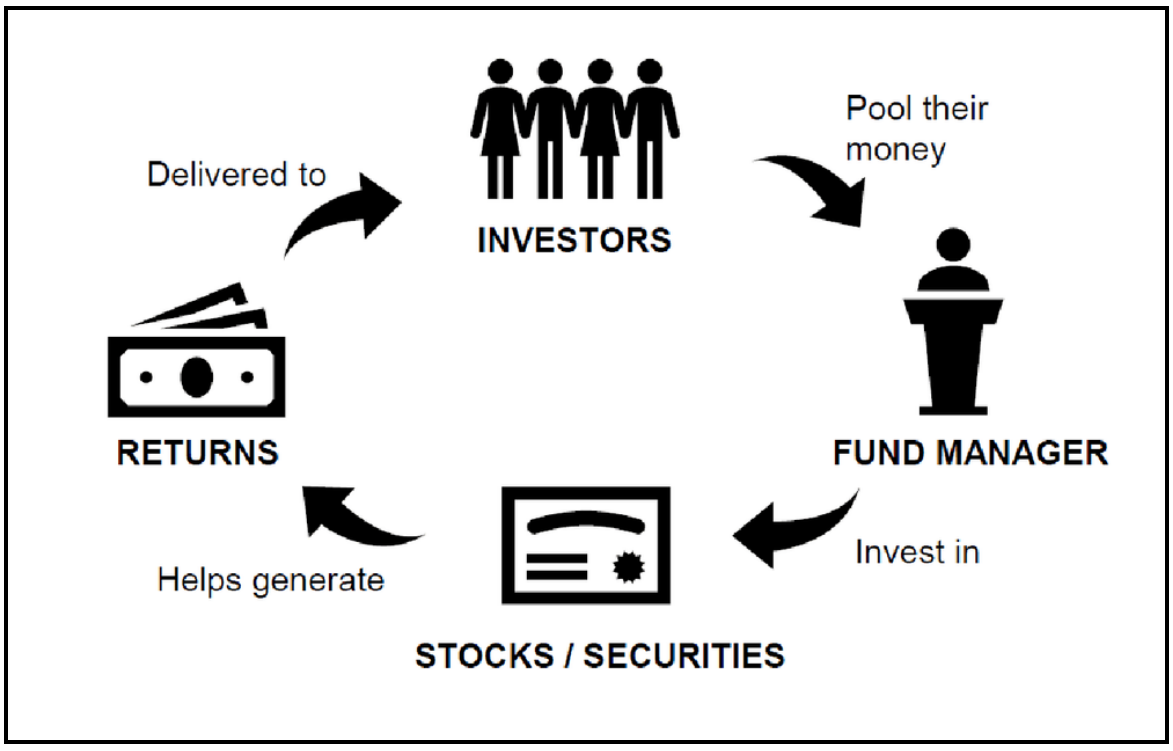
G) A Fund of Funds (FOFs)

Schemes known as fund of funds invest in other mutual fund schemes. Only units of other mutual fund schemes and cash, money market securities, and short-term deposits that are awaiting deployment make up the portfolio of these schemes. Franklin Templeton Mutual Fund introduced the first FOF on October 17, 2003. Depending on the sector, a fund of funds may be sector-specific (real estate

FOFs), theme-specific (equity FOFs), objective-specific (life stages FOFs), or style-specific (aggressive/cautious FOFs, for example).

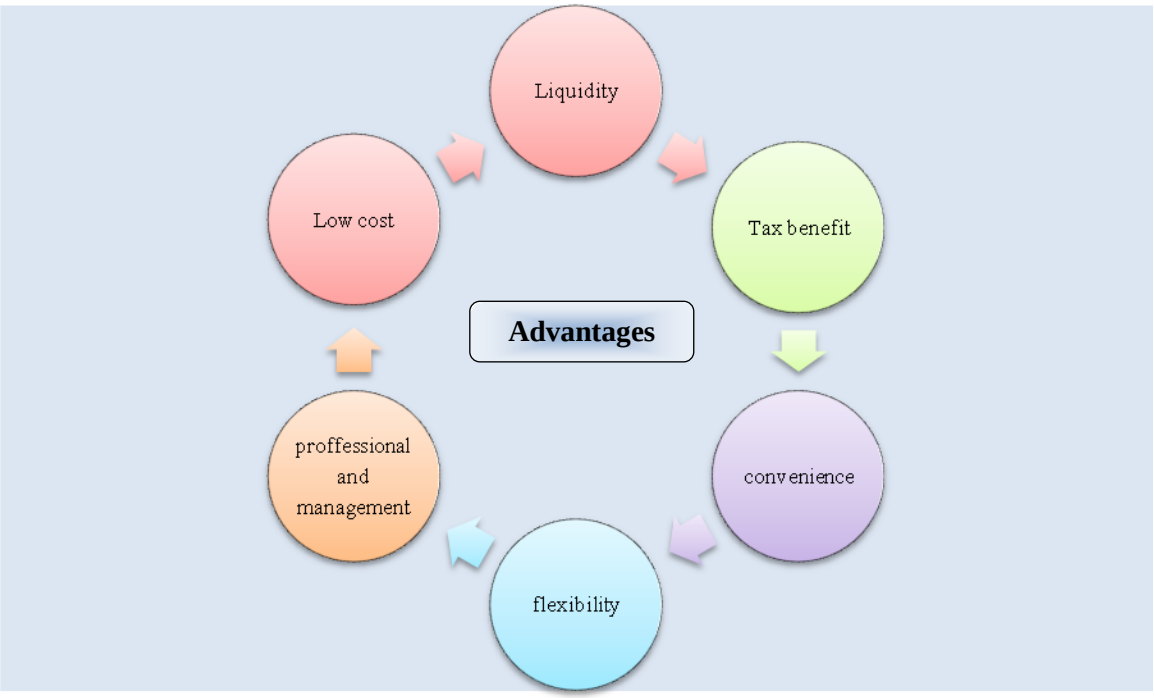
1.9 IDEAL FRAMEWORK FOR THE MUTUAL FUND

Mutual funds, sometimes referred to as asset management companies, are a kind of trust that pools the reserve funds of multiple participants who share comparable financial objectives. As a result, capital market instruments like shares, debentures, and completely different securities are given the cash that were raised. The percentage of capital appreciation and earnings from these endeavours are distributed to unit holders based on the number of units they possess. As such, the most trustworthy investing choice available to the general public is an asset management firm, as it offers a comparatively simple means of allocating money into a distinctive, expertly managed wicker bin of securities. An extensive summary of a shared store's functionality may be found in the stream graph below:



(Source: Kotaksecurities.Com)

1.10 ADVANTAGES OF MUTUAL FUND



- **Liquidity:**

  In this manner, Investors are able to buy or sell certain stocks, shares, or bonds at any moment at the market price, also known as the NAV. The mutual fund scheme's structure affects liquidity. When compared to other investing options, this makes investments in mutual funds extremely liquid. In order for investors to sell units at the current market value of their investment, the scheme must be listed on the stock exchange.

- **Tax Benefits:**

  High returns for investors and improved tax planning are two advantages of mutual funds. Investors are provided mutual funds with an assortment of tax-saving options. This draws in additional mutual fund investors.

- **Convenience:**

  The ease with which mutual funds provide their investors is the reason for their widespread popularity. Investors do not need to use an intermediary to buy or sell mutual fund shares or units. Once a day, investors trade at the closing NAV using an online application form. Mutual fund shares or unit values are usually published in regional and national newspapers. Mutual funds offer a variety of practical transaction methods, including the capacity to plan automated transactions, add extra funds to the account, and withdraw just a portion of the balance from the investment account.

- **Flexibility:**

  Mutual funds are a very adaptable form of investing for a variety of uses. An investor may put money into a single fund or a number of them. The trading and investing procedures are more adaptable. Investors like mutual funds the most, therefore. Certain features, such dividends, automatic deposit, systematic withdrawal, annuity sub-accounts, short- and long-term savings, and practically infinite investing techniques to create the finest mutual fund schemes, do offer some flexibility. Additionally, mutual funds offer the option of lump sum or systematic investment plans.

- **Professional Fund Management**:

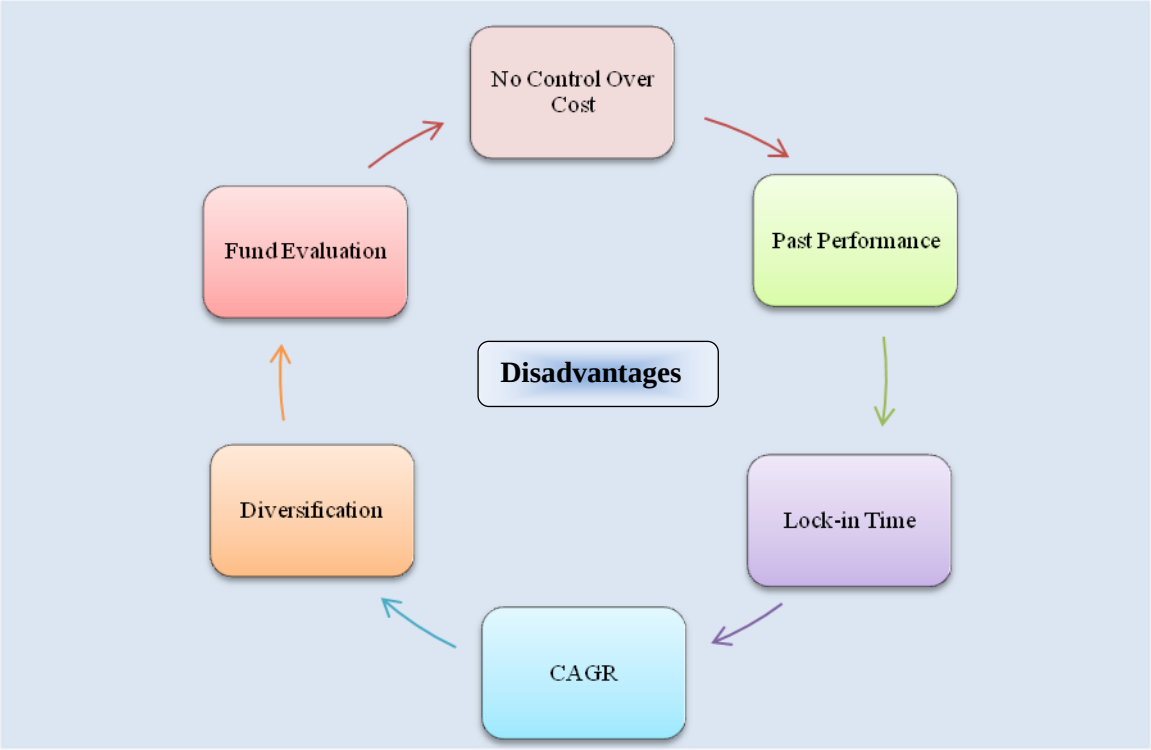
  To handle investor money, mutual funds employ astute full-time investing specialists. They have conducted more in-depth analysis of market trends and economic situations at the corporate level. Consequently, a qualified fund manager is able to oversee the fund's investing goals. Mutual funds give their investors the chance to increase their wealth and generate income through expert management.

  Mutual funds typically charged each investor 2% to 3% of their annual total investment in addition to a component of the profit once expenses were subtracted. Mutual funds only take out one to two percent of the total cost. Investors who put money into no-load Therefore, they rarely or never pay sales taxes.

- **Low cost:**

  A mutual fund scheme pools the money of several investors, which is subsequently used to purchase securities. Nevertheless, compared to a single transaction, these monies are invested in assets, allowing one to save on transaction fees and other costs. Additionally, the costs for the Asset Management Service are reduced and distributed among all scheme participants.

1.11 DISADVANTAGES OF MUTUAL FUND



- **Diversification**

  A common claim to be among the main advantages of a mutual fund is diversification. But there's always the chance of over-diversity, which might raise fund running costs, necessitate more investigation, and lessen the proportional benefits of diversification.

- **Fund evaluation**

  It could be challenging for a lot of investors to thoroughly investigate and assess the worth of various funds.

  Investors can learn how much a mutual fund's portfolio is worth by looking at its net asset value (NAV).However, investors must examine a number of factors, including standard deviation and the sharp ratio, among others, to determine how well one fund has performed in comparison to another, which may be somewhat complex.

- **No control over cost**

  While fees were a benefit in the previous section, they are a drawback in mutual funds as well. In India, several mutual funds come with hefty fees. There will be departure fees if you leave before the allotted period. The amount cannot be withdrawn prior to the specified deadline.

- **Past performance**

  Businesses' ratings and advertisements are just a representation of a fund's past success. It is important to keep in mind that a fund's impressive past performance does not guarantee that it will continue to perform well in the future. Investors should assess a fund house's overall performance throughout time and in different market phases, as well as its investment philosophy, transparency, ethics, and compliance. Ratings are a useful tool for reference.

- **Lock-in Time**

  Because you are unable to remove your funds prior to the designated time, the lock-in period may occasionally prove to be a major disadvantage. As a result, you are unable to withdraw the money you have invested in an emergency.

- **CAGR**

Investors are not adequately informed about the level of risk associated with mutual funds or the investing strategy when comparing their performance to the CAGR.

As such, it is merely one indicator of a fund's performance and by no means comprehensive.

1.12 SELECTED MUTUAL FUND SCHEMES' PROFILE

With a certain amount of risk, investors are receiving decent returns from mutual fund schemes, which are performing well. These mutual fund schemes are rated by many rating agencies. Rating agencies assign ratings to mutual fund schemes based on a variety of factors, including market performance, investment strategy, services, programmers, investment management, and risk management approaches (CRISIL, 2014).

The total asset value under management of the 829 open ended and 1513 closed ended mutual fund schemes is Rs. 1355156.29 crore, as reported by the India Security and Exchange Board (2016). The CRISIL Rating Agency was used to determine which mutual fund plans to include in this analysis. CRISIL is the largest analytical firm in the world that rates stocks, bonds, funds, commodities, etc.

Increasing market competitiveness in the financial sector is the main objective of the CRISIL rating agency, which enables mutual fund firms to function more efficiently and provide a greater array of options for financial market exploration (CRISIL, 2014).

The CRISIL rating agency claims that every open-ended fund in the financial market has done better than every other fund. The equity, debt and hybrid mutual fund schemes that were selected for this analysis in December 2014 all outperformed their respective CRISIL rankings.

Table 1.1: Selected Mutual Fund Schemes Profile

DEBT FUND	EQUITY FUND	HYBRID FUND
Sbi magnum gilt Ltp fund	Uti mnc fund	Hdfc balanced fund
Canara Robeco liquid fund	Franklin India smaller cos fund	Uti mis advantage fund

(Various Mutual Fund Scheme Types)

(Source: CRISIL, 2014)

The method used to choose the top two rated schemes from each mutual fund category is shown in the above image. Open ended funds are rated by the CRISIL using a range of criteria, such as prior performance, asset quality, liquidity analysis, absolute returns, volatility of a particular market, AUM, exposure from portfolio management, etc.

1 DEBT FUND

The CRISIL ranking indicates that a number of debt fund programs outperform others. The best debt funds for the current study are CANARA Robeco Liquid Fund and SBI Magnum Gilt-LTP Fund. Debt funds offer a safe return on investment with less risk.

a) Sbi magnum gilt – ltp fund

The money issued by government securities is known as gilt funds. The safest option for investors is to invest in gilt funds. Investments in gilt funds are permitted for a minimum of three years, and so forth. The SBI Magnum Gilt-LTP Fund has beaten the other Gilt funds in the group since 2013. CRISIL has determined that the SBI Magnum Gilt-LTP Fund is the best long-term gilt fund strategy. On January 1st, 2001, the SBI Magnum Gilt-LTP Fund was established (CRISIL Research, 2015).

The SBI Magnum GLP Fund's main objective is to invest in government securities and provide investors with dependable returns with no credit risk. To generate a

consistent income is the aim of an investment in the SBI Magnum Gilt-LTP Fund. Since government securities are long-term investments, investors who are risk averse are typically the ones that purchase them. Investors in the SBI Magnum Gilt -LTP Fund must be willing to take on a substantial amount of risk. Gilt assets are impacted by interest rate risk (SBI Mutual Fund, 2015).

b) Canara Robeco liquid fund

Funds investing in debt securities, money market instruments, certificates of deposit, Treasury bills, and other similar products are known as liquid funds. The Canara Robeco liquid fund has good performance among liquid funds. The Canara Robeco liquid fund was founded on July 14, 2008. The main objectives of the Canara Robeco Liquid Fund are to increase asset values and preserve liquidity levels. To obtain the average return over a longer period of time, shorter-term investments are made. The goal of investing in Canara Robeco liquid funds is to minimize risk. Given its low risk, the fund has the potential to yield standard returns for investors. The shorter time period results in less volatility in the values of liquid funds. Because of the shorter investment period and lower default and value fluctuation risk, the interest rate and credit risks have no effect on liquid fund schemes (Canara Robeco, 2016).

2 EQUITY FUND

Equity funds perform well and enhance the way the financial markets are run. Therefore, equity fund plans received the highest grade from CRISIL. Equity funds come in a variety of forms, and each one carries some level of risk. The UTI MNC Fund and the Franklin India Smaller Cos Fund have been selected for this investigation.

a. Uti Mnc Fund

UTI MNC fund is one type of Diversified Equity Fund Scheme. UTI MNC fund was ranked #1 by CRISIL due to its excellent performance in the Diversified Equity Fund Scheme categories starting in 2011. The UTI MNC

Fund was formally created on May 29, 1998. For investors that are willing to take on a significant amount of risk, there are UTI MNC funds. Because of the considerable risk in the current market, investors would obtain a high return or value (UTI Mutual Fund, 1996). One kind of Diversified Equity Fund Scheme is the UTI MNC fund. Because of its outstanding performance in the Diversified Equity Fund Scheme categories beginning in 2011, UTI MNC fund was ranked #1 by CRISIL. On May 29, 1998, the UTI MNC Fund was formally established. Investors that are prepared to assume a substantial degree of risk can consider UTI MNC funds. Investors would receive a high return or value due to the significant risk in the current market (UTI Mutual Fund, 1996).

b. Franklin India Smaller Cos Fund

On December 14, 2005, the Franklin India Smaller Companies Fund was founded. The main objective of the Franklin India Smaller Companies Funds is to create a portfolio of small and medium-sized companies in order to diversify risk. Small and medium-sized firms receive the remaining half of the investment, with 75% going to them. CRISIL Research (2015) ranks the Franklin India Smaller Company Fund as the highest ranked fund. Under the category of Diversified Equity Fund Scheme for Small and Medium-Sized Businesses, the Franklin India Smaller Company Fund is included. The fund is more volatile than average because of its high level of risk and concentration on small and medium-sized market capitalization companies. A significant risk turns into a sizable profit for the investors. By making investments over a three- to five-year period, the strategy seeks to increase asset prices (Franklin Templeton Investments, 2016).

3 HYBRID FUND

Instruments for debt and equity funds make up a hybrid. Debt hybrid funds are defined as such when the debt fund investment allocation exceeds that of the equity fund, or vice versa (Abraham & Shashikant, 2009). Within the category of hybrid funds, The UTI MIS Advantage Plan and the HDFC Balanced Fund have been chosen for this specific study.

A.HDFC Balanced Fund:

The HDFC Balance Fund Scheme's main objective is to lower risk by accumulating a portfolio through investments in various debt and equity schemes. The HDFC Balanced Fund was founded on September 11, 2000 (CRISIL Research, 2014). When sixty percent of the investments in the portfolio are in equity schemes and thirty percent are in debt schemes, the portfolio is known as equity related hybrid funds. CRISIL named the HDFC Balanced Fund Scheme the best because of its superior investor return, highest asset under management, and increased market volatility. To increase the HDFC Balanced fund's asset values, investment managers add both actual and current investor income to the fund. Extended time frame. Investors in HDFC Balanced fund have different levels of risk because their goal is to manage their portfolio by purchasing shares of major market capitalization companies and fixed income instruments (HDFC Mutual Fund, 2014).

B. Uti Mis Advantage Plan

A monthly income plan helps investors by offering consistent income over a reasonable period of time. The safest course for investment managers would be to allocate their capital to debt and fixed income instruments that distribute fixed dividends to shareholders on a monthly, quarterly, and half-yearly basis. The UTI Monthly Income Scheme Advantage Plan was created on December 16, 2003. UTI MIS Advantage Plan received the top score from CRISIL due to its superior performance compared to the other monthly income schemes in the group (CRISIL Research, 2016). With investments in assets connected to debt and equities, asset accumulation is the main objective of the UTI Monthly Income Scheme Advantage Plan. Seventy-five percent of investments are made in debt instruments including money market and fixed income securities, with the remaining 25 percent invested in equity-related assets. Since these schemes provide the safest way to invest large amounts of money in debt instruments, risk-averse investors generally favors them. There is a fair amount of risk associated with the UTI monthly income plan's advantage plan. (Fund UTI Mutual, 1996)

CHAPTER 2

LITERATURE REVIEW

INDEX

2.1 INTRODUCTION

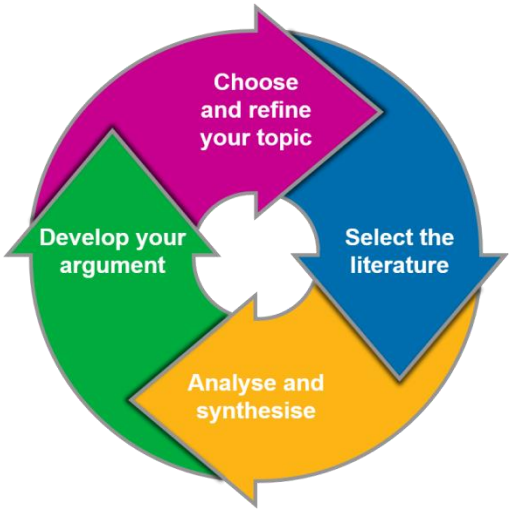
A crucial part of every academic research is the literature review, which gathers & properly presents the literature on a certain topic.

The literature reviews are focused on two areas:

- Conduct a search for information
- Critically evaluate information

  Literature is a group of papers or articles that try to analyze and review important aspects of the current issue. It does not contain any new or original research effort because it only uses secondary information sources. It is mostly composed of written works, including books, research papers, and working papers, as well as occasionally significant online resources. There may be industry reports, regulatory documents and guidelines, firm research studies, and so on.

2.2 WHAT IS LITRATURE REVIEW?



A written summary of important books and other sources on a certain topic is called a literature review. The sources for the review could include scholarly works, journal articles, government reports, websites, etc. The literature review includes a description, summary, and assessment of each source. It is usually prepared as a stand-alone chapter for a dissertation or graduate thesis.

2.3 PURPOSE OF LITRATURE REVIEW

A critical written assessment of the status of research on a chosen topic is what a literature review is supposed to do.

- Determines previous areas of scholarship.
- Examines each source in light of how it advances knowledge of the particular problem, field of study, or theory being examined.
- Describes how each source relates to the other sources you have chosen.
- Finds fresh perspectives on prior research and fills in any gaps in understanding.
- Defines the path for additional investigation

2.4 COMPONENTS OF LITRATURE REVIEW

The literature review should include the following:

- The purpose of the review of literature.
- A synopsis of the topic being discussed.
- Clearly classifying the materials you have chosen into those that support your
- A specific stance, those who disagree, and those putting out entirely alternative ideas.
- A conversation on each source's unique qualities as well as how similar it is to the others.

2.5 LITRATURE REVIEW

(patil, 2017) Any investing decision must be made with the underlying tenet of maximizing return while minimizing risk. The Indian capital market offers a range of investment opportunities that assist investors in striking a balance between return and risk. For a variety of reasons, none of the direct investors can make an investment in a way that maximizes reward while lowering risk. Therefore, using mutual funds to make investments is one of the key strategies for making balanced investments. Understanding

the performance of the various mutual fund schemes is essential when making investments through them in order to maximize returns. Understanding the risk and return of the various open-ended mutual fund schemes that are available in India is the goal of the current study. The Reserve Bank of India, the Association of Asset Management Companies, and other websites provided the only secondary data used in this study. Treynor's, Jensen's, and Sharpe's ratios have all been used to assess the success of different mutual fund schemes.[1]

(wachasunder, 2018) Most Indian investors strive to minimize risk in order to maximize returns on their investments. Banks and post offices offer the safest investment options, but their low interest rates make them less appealing. In contrast, mutual funds offer better rates of return while minimizing risk thanks to expert and prudent portfolio management by the portfolio manager. This essay compares the performance of mutual fund schemes with liquid debt to the CCIL T Bill Liquidity to determine if the funds are outperforming or underperforming. Secondary data have been used in the study in an attempt to achieve these goals. The purpose of this study is to evaluate the performance of Indian open-ended liquid debt mutual funds. Based on yearly returns relative to benchmark returns, a sample of eleven liquid debt mutual fund schemes has been chosen in order to assess performance**.** [2]

(ghuge, 2019) In India, the mutual fund industry has grown astronomically during the past several years. Mutual funds are now the principal investment option of choice for many small investors. Every year, more and more SIPs are invested in mutual funds. There are

[1] Patil, R. D. (2017). PERFORMANCE EVALUATION OF GROWTH ORIENTED MUTUAL FUND SCHEMES IN INDIA. *International Journal Of Core Engineering & Management*, *3*(10). https://www.researchgate.net/publication/362647065

[2] Wachasundar, S., & Wachasundar, S. L. (2018). PERFORMANCE EVALUATION OF LIQUID DEBT MUTUAL FUND SCHEMES IN INDIA. In *International Journal of Management* (Vol. 8). http://www.ijmra.us,http://www.ijmra.us,

many mutual fund schemes on the market for investors to pick from and invest in due to rising demand. The researcher's attempt to use the Sharpe Ratio to assess the performance of particular Indian equities mutual fund schemes is presented in this study. Nobel laureate William Sharpe developed the Sharpe Ratio, which is used to measure risk-adjusted returns on investment portfolios and helps investors understand how investments perform in relation to their risks.[3]

(tripathy, 2004) The process of reform has signaled a wave of shifts in investment and savings behavior, which has expanded the financial sector's growth. Since the early 1990s, the Indian financial system—in general, and the Mutual Fund (MF) industry—in particular, have been improving. Mutual funds have gathered significant investments for the corporate sector throughout this time. One of the most powerful catalysts for the tremendous increase in investment in the capital market in India has been the expansion and development of mutual fund products. It is now crucial to closely monitor and assess mutual funds in this environment. As a result, from 1994–1995 to 2001–2002, 31 tax planning schemes in India are evaluated for performance in this study. This study looked at six performance metrics to assess how well Indian mutual funds performed as investments.[4]

(srinivasan, 2023) The mutual fund business in India has grown at an incredible rate in the last few years. Many people with modest means have chosen mutual funds as their

[3] Ghuge, N. (2019). *A Study of Performance Evaluation of Selected equity mutual fund schemes in India using Sharpe's Ratio*. https://www.researchgate.net/publication/340455787

[4] Tripathy, N. (2004). An Empirical Analysis of Performance Evaluation of Mutual Funds in India-A study on equity schemes An Empirical Analysis on Performance Evaluation of Mutual Funds in India: A study on Equity Linked Savings Schemes. In *ICFAI Journal of Applied Finance*. https://www.researchgate.net/publication/265509988\

preferred investing instrument in recent years. The quantity of SIPs invested in mutual funds has been increasing on an annual basis. The variety of plans offered has increased dramatically along with the growth of the mutual fund industry. The author evaluates the effectiveness of several mutual fund strategies for Indian stocks as part of this paper. This study compared the performance of five distinct equity mutual fund schemes between 2019 and 2022.The study reveals that every scheme in the sample has outperformed the market, with the exception of one. More than 60% of the research strategies outperformed the market with the use of excellent stock selection abilities.[5]

(biswas, 2022) The financial industry has a significant impact on the economic growth of nations like India. This sector, which contributes more to economic development than other sectors, includes the mutual fund industry. Mutual funds are collective investment vehicles that pool the capital of different kinds of investors. Individual investors who put their own money into stocks become the direct owners of those stocks. Put simply, because they are ignorant of the stock market, investors are placing their own money into mutual fund schemes. After the fund manager invested in quality stocks through these mutual fund schemes, they are receiving higher returns. [6]

(marudhadurai, 2016)A tool that helps the capital market by drawing in small and medium-sized investors is the mutual fund. Investing in mutual funds has numerous advantages, including cost, tax advantages, reduced risk, asset value, and dividend announcements. Over the past ten years, the mutual fund industry in India has

[5] Mahesh, G., Geethanjali, D., Lokesh, D., & Srinivasan, M. S. (2023). *A Study on Performance Evaluation of Selected Indian Equity Mutual Funds* (Vol. 16, Issue 4). https://www.researchgate.net/publication/374673568

[6] Biswas, D. (n.d.). *ANALYSIS THE PERFORMANCE OF FUND MANAGER OF MUTUAL FUND: A STUDY ON SELECTED EQUITY SCHEMES IN INDIA DURING PRE AND POST LOCKDOWN PERIOD Article in International Journal of Management IT and Engineering · February 2022 CITATIONS 0*. https://www.researchgate.net/publication/372861072

experienced unprecedented success. Since its founding, the AUM has increased dramatically, from Rs. 25 crore in 1965 to Rs. 701443 crore in March 2013. Investor predisposition for mutual funds is demonstrated by the increase in the number of schemes offered by Indian mutual funds, from 403 schemes in 2002–03 to 1294 schemes in 2011–12. The amount of money raised by public sector funds ranged from Rs. 314706 crore in 2002–03 to Rs. 10, 019,023 crore in 2009–10, with public sector mutual funds accounting for about 80% of the total amount raised.[7]

(umesh, 2023) In light of liberalization and private entry into the Indian mutual fund industry, fund managers' major concern has been how to continue operating and retaining investor confidence. Stocks are a good option for novice investors who don't have the time or expertise to make direct investments. Mutual fund investing is a good alternative. The performance of mutual fund products is more complicated when investing objectives are combined with measurements for return and risk. This essay aims to investigate, through the use of risk-return relationship models and measurements, the performance of a few mutual fund schemes. A total of 23 plans provided by six private-sector mutual funds and three public-sector mutual funds were analysed over a 13-year period, from April 1996 to March 2009. [8]

(rout, 2019) In India capital market gives a diversity of investment alternatives to the stakeholders to support them to invest in different investment tools and to make positive the profitable return. Along with diverse range financial products, mutual fund ensures the maximum return and minimum risks to the investors. Development of various mutual fund schemes in the Indian capital market has proved to be one of the most catalytic

[7] Marudhadurai, U., & Unnamalai, T. (2016). Fund Investments in Musiri Taluk. In *International Journal of Management* (Issue 2). www.jifactor.com

[8] Panda, C., Chintamani Panda, M., & Gupta, U. (n.d.). *A Study on Equity-Based Mutual Fund Scheme Performance in the Indian Environment* (Vol. 12). https://www.researchgate.net/publication/376990131

investment avenue in generating significant investment growth. Many technical and analytical theories have developed over the years, and when paired with contemporary technology, they provide investors with useful guidelines. The major players in the market, such as mutual funds and foreign institutional investors, have access to and experience with a wide range of analytical tools and are adept at using them. The majority of small investors are not positioned to profit from the market in the same way that mutual funds are.[9]

(sivabagyam, 2016) Using a range of measures and risk-return relationship models, this study attempts to examine the performance of particular mutual fund growth option (type) schemes. Because mutual fund growth option schemes have the potential to increase in value over the medium to long term, Indian investors are more likely to favour them. Examined were 42 growth option schemes offered by various mutual funds between April 1, 1997, and March 31, 2012 (15 years). The 15 years were divided into three phases: Phase I, which ran from April 1, 1997, to March 31, 2002; Phase II, which ran from April 1, 2002, to March 31, 2007; and Phase III, which ran from April 1, 2007, to March 31, 2012. The period began on April 1, 1997, with the purpose of conducting a research on the evaluation of the performance of particular mutual fund schemes in India following liberalization. 1991 saw the start of the economic liberalization process, and in 1993 and 1996, SEBI published Mutual Fund Regulations. [10]

(y.maheswari, 2021) Synopsis In addition to investing the money gathered in shares of listed businesses, government and corporate bonds, short-term money market instruments,

[9] Rout, B. (n.d.). *PERFORMANCE EVALUATION OF INDIAN MUTUAL FUND SCHEMES AND ITS IMPACT ON INVESTMENT DECISION INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, ECONOMICS & MANAGEMENT*. http://ijrcm.org.in/http://ijrcm.org.in/iiCONTENTS

[10] R Sri Krishna, S. K. (n.d.). *PERFORMANCE EVALUATION OF GROWTH MUTUAL FUND SCHEMES IN INDIAN SCENARIO AFTER LIBERALIZATION*. www.ijariie.co

other securities or assets, or a mix of these, mutual funds are a major player in the mobilization of capital from various investors. Since their inception, mutual funds have been the most popular option for small investors looking to invest. The high investor return and low risk level may be the main drivers of this. People nowadays believed that investing in mutual funds was the safest option. In the Indian capital market, the expansion of various mutual fund schemes has emerged as one of the most responsive venture routes, yielding notable speculative development.[11]

(dinesh, 2023) Overview this study aims to investigate the expansion of the mutual fund sector in India. Secondary data were employed in the research. The Securities and Exchange Board of India's (SEBI) introduction, assessment, and list of regulatory initiatives are covered in the first section. The assets under management (AUM) of the Indian mutual fund sector and its development alongside the global mutual fund industry are covered in the second section. The current study's last section offers some closing views, indicating that the mutual fund sector in India is maturing due to an increase in large investors and geographic reach.[12]

(bhavana, 2019) The history of the mutual fund business in India began in 1963. In terms of the number of asset management firms, schemes, investors, and money invested in mutual funds, among other metrics, the mutual fund industry in India has grown significantly. Additionally, mutual funds have contributed significantly to the industrial and economic development of the nation. The main source of funding for the mutual fund industry is the household sector. The growth rate of household sectors' savings has been increasing annually. Is the mutual fund sector successful in India? is the question this study attempts to answer. Indian mutual funds haven't made full use of potential investors'

[11] Maheswari, Y. (2021). PERFORMANCE EVALUATION OF SELECT MUTUAL FUNDS IN INDIA. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3959872

[12] Verma, S. K., & Nema, D. K. (2023). An Evaluation of the Developments in the Indian Mutual Fund Industry. *Abhigyan*, *40*(4), 21–33. https://doi.org/10.56401/abhigyan/40.4.2023.21-33

potential. Mutual funds have been successful and have contributed significantly to the growth of the economy, industry, etc. in industrialized nations like the USA and Japan[13].

(anshika, 2014) The regulatory and governance framework modifications have resulted in an enhancement of investor trust. The Indian economy has grown faster and more competitively since it was liberalized and deregulated. It has also had an impact on the mutual fund industry, requiring fund managers to regularly assess mutual fund performance in order to determine which mutual fund schemes perform better than others and endure in the market. This study examines the performance of a few chosen mutual fund schemes following the 2007–2008 financial crisis. The performance of the mutual funds is also compared to relevant benchmarks, tests, selectivity, and the fund managers' market timing skills in this article. Key words: Treynor's Ratio, Sharpe's Ratio, and Jensen's alpha[14]

(sathish, 2023) The global mutual fund industry has amassed a substantial corpus and is regarded with great credibility by a variety of investor groups who are drawn to the many schemes provided by some of the most respected asset management companies in the world. Now, investors in the Indian market can choose a plan that offers a higher rate of return on investment. To satisfy regulators and investors, it is imperative that asset management companies and fund managers appropriately manage the fund portfolio. This research project offers a comprehensive grasp of how to design a suitable mutual fund that will appeal to a wide spectrum of investors, from small-scale individual investors to large corporations. [15]

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[13] Sanjay, A., & Bhavana Raj, K. (2019). Performance and persistence of Indian mutual fund industry. *International Journal of Recent Technology and Engineering*, *8*(2), 5212–5216. https://doi.org/10.35940/ijrte.B1047.078219

[14] Aggarwal, S. P. (n.d.). *A STUDY OF PERFORMANCE EVALUATION OF SELECTED MUTUAL FUND SCHEMES*. https://www.researchgate.net/publication/340594677

[15] Kumar, J. S. (n.d.). *AN INVESTIGATION ON THE FORMATION OF A PERIODIC SCHEME IN A CONFINED PORTFOLIO (MUTUAL FUND) WITH SPECIAL REFERENCE TO CHENNAI*. https://www.researchgate.net/publication/376457452

(singh b. , 2016) The Indian stock market had significant volatility in 2014 and 2015. On March 24, 2014, the Sensex passed the 22,000 mark. On March 4, 2015, it reached the historic level of 30,000. From then on, it corrected by more than 15% till the end of 2015. Which approach is more profitable in a market this volatile—passive or active? Even though actively managed mutual fund schemes have higher transaction costs and management fees, is it still worthwhile for an investor to incur these charges in the hopes of earning higher returns, or is staying passive in a volatile market a better option?[16]

(indranil, 2017) In the last four years, the AUM of the mutual fund sector in India has more than doubled thanks to significant involvement from individual investors and substantial inflows into equity schemes. One essential requirement for the fund managers is to maintain the same level of performance during bull and bear markets. If not, investors will have to rotate their mutual fund holdings as the markets go through different stages. The goal of this study is to determine whether there are any appreciable differences between succeeding bear and bull markets in terms of risk-adjusted returns, the ability of fund managers to make decisions, and the price co-movement of the fund and benchmark. Risk-adjusted return has been measured using the Treynor and Sharpe ratios as well as Jensen's alpha[17].

(murlidhar, 2016) With the advent of several financial institutions, financial services, and financial instruments in the post-LPG era, the Indian financial system was revitalised. This procedure has made it possible for private companies to launch new financial

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[16] Singh Hada, B., Kumar Suri, A., & Jha, B. (2016). *"A Critical Analysis of Performance of Active and Passive Investment Strategy of Indian Mutual Fund Schemes."* http://www.europeanjournalofeconomicsfinanceandadministrativesciences.com

[17] Sarker, I. (2017). *PERFORMANCE OF SELECT LARGE CAP MUTUAL FUND SCHEMES DURING BEAR AND BULL PHASES OF INDIAN SECURITIES MARKETS: AN EMPIRICAL STUDY THESIS SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY (COMMERCE) IN COMMERCE*.

institutions and provide a range of financial products and services. Mutual funds were one of these establishments. Numerous private corporate entities have launched mutual funds right away following approval from the government or SEBI. Reliance Mutual Funds was one of the early entrants and has made a substantial contribution to mutual fund services. Ten of Reliance Mutual Funds' best-performing schemes have been chosen for the current study in order to compare the risk and return that these funds provide.[18]

(jacob, 2015) Over the last 20 years, there has been an incredible expansion in the mutual fund business. The importance of the Indian mutual fund business is demonstrated by the rise in the number of schemes with higher fund mobilisation in recent years. Making informed investment selections for individual investors is facilitated by accurately evaluating the performance of various funds and comparing them to other funds. Mutual funds, out of all the financial solutions available, guarantee investors the lowest risks and the highest returns. One of the most effective catalysts for the tremendous expansion in investment in the Indian capital market has been the creation of diverse mutual fund products. In this regard, careful observation and assessment of mutual funds have become imperative. [19]

(sumalatha, 2008) The study's aims are to analyse the structure of the Indian mutual fund business, investigate the level of rivalry among mutual funds, and look at sector-wise and within-sector competition in light of the growing relevance of mutual funds in developing nations like India. According to the initial observation, the industry saw significant changes following liberalisation. An effort was made to determine whether the mutual

[18] Ayaluru, M. P. (2016). Performance Analysis of Mutual Funds:Selected Reliance Mutual Fund Schemes. *Parikalpana: KIIT Journal of Management*, *12*(1), 52. https://doi.org/10.23862/kiit-parikalpana/2016/v12/i1/133055

[19] Jacob, T., & Kattookaran, T. P. (2015). A Comparative Study of the Mutual Fund Schemes of Reliance and Unit Trust of India. *MUDRA : Journal of Finance and Accounting*, *2*(1). https://doi.org/10.17492/mudra.v2i1.6443

fund industry's structural changes were the cause of the competition. The study examined mutual fund competition for this reason, taking into account mutual funds from the public, private, and international sectors. [20]

(sumant, 2018) Most Indian investors strive to minimise risk in order to maximise returns on their investments. Banks and post offices offer the safest investment options, but their low interest rates make them less appealing. In contrast, mutual funds offer better rates of return while minimizing risk thanks to expert and prudent portfolio management by the portfolio manager. This essay compares the performance of mutual fund schemes with liquid debt to the CCIL T Bill Liquidity to determine if the funds are outperforming or underperforming. Secondary data have been used in the study in an attempt to achieve these goals. The purpose of this study is to evaluate the performance of Indian open-ended liquid debt mutual funds.[21]

(sireesha, 2021) For a limited time in 2018–2019, a meager attempt has been made to use data envelopment analysis (DEA) to small and large caps in the Indian mutual fund market. According to the study, a set of metrics has been chosen to benchmark mutual fund performance. This study demonstrates the paper's objectives, which include identifying various input and output variables influencing the performance of specific Equity Largecap and Small cap Mutual Funds, measuring the efficiency of the mutual funds chosen, and assessing the performance variation of the chosen mutual fund schemes under constant returns to scale.[22]

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[20] B. S., S. (2011). Analyzing Competition Among the Mutual Funds and Performance of Selected Mutual Fund Schemes in India. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1088657

[21] Wachasundar, S., & Wachasundar, S. L. (2018). PERFORMANCE EVALUATION OF LIQUID DEBT MUTUAL FUND SCHEMES IN INDIA. In *International Journal of Management* (Vol. 8). http://www.ijmra.us,http://www.ijmra.us,

[22] Jain, S. N. (n.d.). A STUDY ON PERFORMANCE EVALUATION OF EQUITY MUTUAL FUND SCHEMES. *UGC Care Journal*, *44*. https://www.researchgate.net/publication/357735672

(sharma, 2020) Mutual funds have become a vital source of capital and have played a significant part in the growth of India's debt market. Since mutual funds generally have lower costs than other investing options, they are regarded as one of the finest possibilities. Plans for mutual funds also include diverse portfolio management, risk reduction, and return maximization. The best investing option for the average person is a mutual fund plan, which offers a professionally managed stock market, minimal risk, and maximum profits. This study's primary goals are to assess the performance of a few debt mutual fund schemes in India and look at the mutual funds' risk and return characteristics.[23]

(vimala, 2022) The mutual fund sector has grown dramatically during the last 20 years. The relevance of the mutual fund sector in India has expanded due to the rise in the number of schemes that have mobilized more funds in recent years. Mutual funds come with a variety of schemes, including large-cap, mid-cap, and small-cap funds, making it challenging for investors to select the appropriate scheme from the wide range of possibilities. The performance analysis of mutual fund schemes based on large, mid, and small caps was the primary emphasis of this study. This analysis aids investors in making decisions based on current risk and return scenarios. Each of these mutual funds is evaluated separately using various metrics, including Sharpe's, Standard Deviation, Beta, and annual returns.[24]

(reinald, 2024) This research uses the 2018 German Investment Tax Reform as a special case study to examine how dividend taxes affect equity mutual fund investments. With

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[23] Sharma, K. B. (2020). *PERFORMANCE ANALYSIS OF MUTUAL FUND: A COMPARATIVE STUDY OF THE SELECTED DEBT MUTUAL FUND SCHEME IN INDIA*. https://www.researchgate.net/publication/343161759

[24] Virparia, V. (2022). PERFORMANCE ANALYSIS OF MUTUAL FUNDS IN INDIA. *International Journal of Management, Public Policy and Research*, *1*(3), 22–34. https://doi.org/10.55829/ijmpr.v1i3.57

the repeal of the overseas tax credit for German fund investors, German equities mutual funds now have an additional avenue for tax planning. Our analysis, which included comparisons with comparable non-German equities and bond mutual funds as well as data from 297 German equity mutual funds, shows a notable change in portfolio allocation following the reform. In order to avoid paying taxes following the change, German stock mutual funds deliberately moved assets to nations with lower withholding tax rates and modified investments within nations. We also look at the tax reform's economic effects and discover a negative correlation between tax burden and post-reform fund inflows.[25]

(ashok, 2021) The purpose of this study is to assess the performance of five large-cap mutual fund schemes and five mid-cap mutual fund schemes that were chosen for the study period, which ran from April 1, 2015, to March 31, 2020. An assessment of the fund's performance, degree of diversification, and manager's aptitude for selecting cheap stocks has been made. All of the sampled schemes, with the exception of one, outperformed the market, according to the report. With the exception of two, all sample schemes outperformed the market, according to the analysis. The study also showed that fund managers' superior stock selection abilities helped around 60% of the schemes outperform the market. [26]

(baldeo, ashish, aanje, & sanjeev, 2022) This study's primary goals are to ascertain the preferences of retail investors for equity mutual fund schemes and to investigate the relative significance of the features of equity mutual fund schemes that retail investors take into account when making investments in different schemes. In order to determine which equity mutual fund scheme qualities are most and least desired by retail investors,

[25] Koch, R. (n.d.). *Taxes and the Investment of Mutual Funds-Evidence from the German Investment Tax Reform*. https://www.researchgate.net/publication/378908936

[26] Bantwa, A. (2021). *A Comparative Study on Performance Evaluation of Selected Large Cap and Midcap Mutual Fund Schemes in India*. https://www.researchgate.net/publication/352993317

this research study employed six different criteria: fund category, plan, manner of investing, risk grade, yearly return, and investment time horizon. In Vidarbha, an area of Maharashtra State, India, 151 retail investors participated in a sample survey. The methods of availability, snowball, and purposive sampling were used to choose the respondents at the end.[27]

(kaur, 2023) Mutual funds can be characterised as an instrument that combines the savings of several small participants with pre-established investment goals into a sizable corpus, which is then invested in a diverse portfolio. The unit holders are then allocated the income or capital appreciation in accordance with their contributions to the corpus. Because it allows people to participate in blue chip firms, it is therefore the best option for small investors who lack sufficient resources. SEBI has implemented a number of initiatives throughout the years to stimulate the mutual fund industry's growth. This essay makes an effort to examine the mutual fund industry's growth trend in India. [28]

(amarnath, 2023) The shutdown prompted by COVID-19 caused a crisis in the credit markets as corporate entities struggled to repay loans they had taken out in the form of commercial paper. When trade volumes declined in certain commercial paper, especially the lower-quality commercial paper, liquidity dried up. As a result, debt mutual funds—like credit risk funds—are having trouble selling the assets in their portfolios. Teams in charge of managing funds are under pressure to sell their holdings and respect investor redemptions in order to comply with regulations. But as the lockdown lengthened, they quickly ran out of choices. This case study looks at the choices open to Franklin

[27] Kakde, B. B. (n.d.). Retail Investors' Preferences towards Equity Mutual Funds: A Conjoint Analysis. *High Technology Letters*, *28*(7), 2022. http://www.gjstx-e.cn/177

[28] Kaur, H. (n.d.). *Growth of Mutual Fund Industry in India*. https://www.researchgate.net/publication/374845530

Templeton India's (FTI) fund manager for managing the six debt schemes that are in crisis.[29]

(sujib, suman, & ranjit, 2022) Mutual funds provide a range of schemes based on each person's needs. Mutual fund systems are being influenced by behavioral bias. This report presents an analysis and interpretation of a comparison research between the investing preferences of bank workers in Tripura regarding mutual funds sponsored by their bank and other mutual funds. The majority of bank workers in Tripura are shown to have strong preferences for the mutual funds that their own bank sponsors. As a result, employees are choosing mutual fund plans based on familiarity biases. The study is unique in its approach.[30]

(surendra, dinesh, & sushma, 2023) The purpose of this study is to evaluate the efficacy of ten carefully chosen equity schemes by comparing and analysing their respective performances. Each of these investment options carries a different level of risk and return. Small investors are frequently unsure about which mutual fund to choose between public and private. Ten equity mutual fund schemes were chosen as a sample for this study during a five-year period, from the financial year 2018 to 2023, in order to support the goals of the research. [31]

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[29] Reddy, M. B. A. (n.d.). *FUND MANAGER DILEMMA AMIDST DEBT MARKET CRISIS: THE FRANKLIN TEMPLETON INDIA MUTUAL FUND CASE MALLA REDDY ENGINEERING COLLAGE FOR WOMEN FUND MANAGER DILEMMA AMIDST DEBT MARKET CRISIS: THE FRANKLIN TEMPLETON INDIA MUTUAL FUND CASE*. https://www.researchgate.net/publication/371011682

[30] Deb, S., Agarwal, S., & Singh, R. (2022). *EXHIBITION OF FAMILIARITY BIAS AMONG MUTUAL FUND INVESTORS: A STUDY ON BANK EMPLOYEES*. https://www.researchgate.net/publication/360889872

[31] Verma, S. K., Nema, D. K., & Yadav, S. (2023). A Comparative Evaluation of Selected Indian Mutual Funds from the Public and Private Sectors. *International Journal of Finance, Entrepreneurship & Sustainability*. https://doi.org/10.56763/ijfes.v3i.151

(bharathi & prakash, 2024) This study explores the complex world of equity mutual funds by using a five-year (2017–2021) detailed analysis of top-performing schemes from ten well-known asset management companies (AMCs). The study uses statistical tools like standard deviation, beta, Sharpe ratio, Treynor ratio, Jensen's alpha, Fama index, and M2 measures to assess the risk-adjusted performance of chosen funds against the benchmark index Nifty 50. This is done through a rigorous methodology that combines risk and return assessments. The results show that several schemes did better than the benchmark and showed resilience in the face of market swings in 2018. These schemes, including Axis Blue Chip Fund Direct Plan-Growth and UTI Flexi Cap Fund Direct-Growth, gave investors a good risk-return profile. With its insights into past performance, the study helps investors make wise judgments.[32]

(gupta, 2013) The last twenty years have seen a sharp increase in the mutual fund business. The importance of the Indian mutual fund business is demonstrated by the rise in the number of schemes with higher fund mobilisation in recent years. The mutual funds must perform like profitable institutional investors in order to live up to the hopes and dreams of millions of retail investors. Making informed investment selections for individual investors is facilitated by accurately evaluating the performance of various funds and comparing them to other funds. This paper's major goal is to analyse the returns on the top-ranked mutual fund schemes by CRISIL and assess their performance against SBI domestic term deposit rates. Averages and rate of return are two basic statistical techniques that are employed in consideration of the interest of retail investors.[33]

[32] Karanth, B., & Pinto, P. (2024). Comprehensive Analysis of Top Equity Mutual Funds: Risk-Adjusted Performance Evaluation Using Statistical Tools 2017-2021. *International Journal of Science and Research (IJSR)*, *13*(1), 87–95. https://doi.org/10.21275/sr231230121649

[33] Gupta BLDEA, P. K. (n.d.). *MUTUAL FUND SCHEMES RANKED 1 BY CRISIL : Tactful Management Research Journal (Oct ; 2013) M.S.ANNAPOORNA AND PRADEEP K. GUPTA A COMPARATIVE ANALYSIS OF RETURNS OF Tactful Managemen... , MUTUAL FUND SCHEMES RANKED 1 BY CRISIL : Tactful Management Research Journal (Oct ; 2013) M.S.ANNAPOORNA AND PRADEEP K.*

(murthy, 2022) Mutual funds are registered with the Securities Exchange Board of India (SEBI) and include sponsors, trustees, asset management companies, and custodians. SEBI (MF) regulation 1996 governs mutual funds. Many investors use mutual funds as a tool because they offer a variety of options and products. Debt and equity instruments are chosen by investors who are willing to assume moderate or lower risks, and they stand to gain. When the stock market does well, the funds can be examined and called in for appreciation. With mutual funds, the assets management organization oversees the investor funds' pools. Securities are used as funding for the invested funds, which are monitored and examined.[34]

(shahid, 2020) The Unit Trust of India (UTI), established by the Indian government in 1963, marked the beginning of mutual funds in that country. In the Indian mutual fund industry, UTI held a monopoly until 1987. For Indian investors, the mutual fund sector was expected to be the most profitable since it offers the choice of a diversified investment structure with a variable degree of risk. It was thought that it would just use the average person's savings. Numerous individuals pool their money to establish a common pool in mutual funds. The investments made with this pool of money are in line with the stated goal. Professional management, diversity, ease of use, and liquidity are all offered by mutual funds.[35]

GUPTA A COMPARATIVE ANALYSIS OF RETURNS OF.
https://www.researchgate.net/publication/321462181

[34] Ch, R. S., & Chodisetty, M. (2022). A Systematic Observation On SIP And LIP In Mutual Funds-With Special Reference to AXIS Bank Equity Fund& HDFC Bank Equity Fund. *Article in Journal of Interdisiplinary Cycle Research*.
https://www.researchgate.net/publication/363753122

[35] Shahid Mazhar, S. (n.d.). *Impact of Demonetization on Mutual Fund Industry in India*.
https://www.researchgate.net/publication/366204503

CHAPTER 3

RESEARCH METHODOLOGY

INDEX

3.1 INTRODUCTION

The systematic study of a subject with the goal of developing new hypotheses, interpreting preexisting ones, or learning new ones is called research. It is an investigation process designed to increase our comprehension of the environment we live in. Research is essential for expanding knowledge and tackling societal issues. It can be done in a variety of sectors, such as the humanities, social sciences, science, and technology.

The main objective of research is to provide true and dependable knowledge using an organized and exacting process. Researchers create studies, frame research questions or hypotheses, gather and evaluate data, and make inferences from their results. By doing this, they add to the corpus of knowledge in their domains and frequently clear the path for additional research and creativity.

A review of the literature on mutual fund performance evaluation was done in the preceding chapter in order to provide a solid theoretical foundation for further research. The goal of the current study is to investigate how mutual funds function in India.

Only debt and hybrid mutual fund schemes are the subject of the study. It also examines how the regulatory landscape surrounding mutual funds has expanded, risk-return analysis, scheme performance assessment, and investor perception of mutual funds in India. To address the research methods used for the study, this chapter goes into detail on the sampling strategy, data collecting, data analysis, research equipment used, and study constraints.

Over the past few decades, the mutual fund business in India has grown significantly, meeting the various investment demands of both individuals and organizations. Amidst the multitude of choices accessible to investors, the assessment of mutual fund performance is a crucial component in the decision-making process. In order to shed light on the elements impacting the success of mutual fund schemes in India and to offer useful insights to stakeholders, this research attempts to undertake a thorough evaluation of the schemes' performance.

3.2 PROBLEM IDENTIFY

After doing the initial, extensive literature reviews, the aforementioned topic was selected for the study. It was discovered that a significant amount of research and work was done to mark the performance of the mutual fund schemes, but not much was done to improve the schemes' performance.

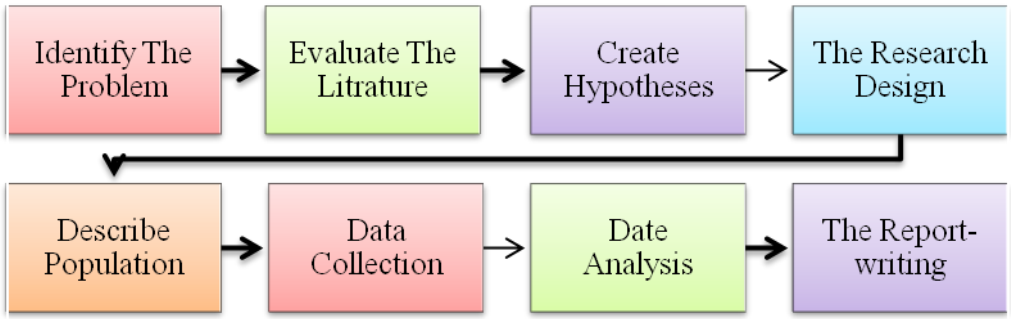
As was previously said, a great deal of research has been done on the performance of mutual fund schemes. There is an abundance of information available on mutual fund schemes' performance. The majority of research has focused on a single factor at a time, which is extremely important because a variety of interrelated factors affect the mutual fund schemes' success. A mutual fund's performance cannot be determined by examining each of its constituent parts one at a time and rating them independently.

The fund manager needs to be able to connect his plan with a single performance measure that adds up all the components at once in order to obtain a score that will increase the scheme's performance.

The fund manager's main goal is to minimize risk and increase returns on his schemes in order to grow a portfolio that will help him reach his objective.

3.3 PROCESS OF RESEARCH

Chart 3.1

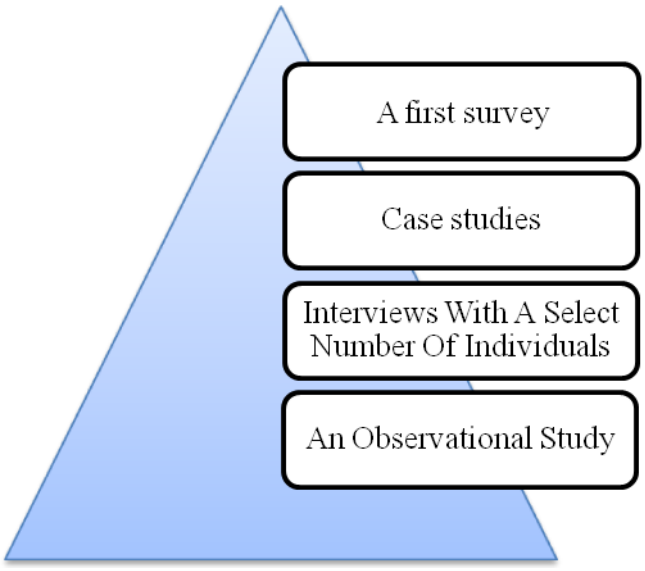


(Source: questionpro.com)

STEP 1: Identify the Problem

The first stage is to identify a problem or develop a research question. A clear research challenge will direct the investigator through the entire process, from formulating goals to selecting a method. There are several ways to learn more about a subject and improve your comprehension of it.

For example:



STEP 2: Evaluate the Literature

The research procedure requires a detailed analysis of the pertinent studies. It helps the researcher to pinpoint the exact elements of the issue. Upon discovery of an issue, the investigator or researcher must learn more about it.

This step provides context for the problem area. It instructs the researcher on earlier studies, their methodology, and their findings. By conducting a literature review, the researcher can establish coherence between his findings and those of others. An evaluation of this kind exposes the researcher to a larger corpus of information and facilitates his effective navigation of the research process.

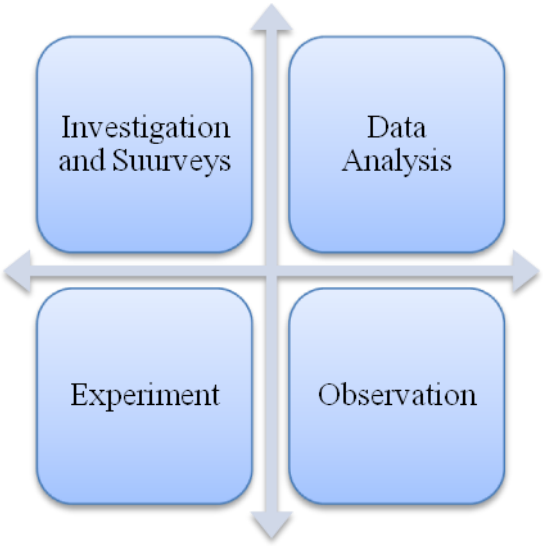
STEP 3: Create Hypotheses

The next logical step after defining and refining the study topic is to formulate an original hypothesis. Logical relationships between variables are solved by a belief. A specific level of competence in the topic is required of a researcher in order to establish a hypothesis. When developing a hypothesis, researchers should remember that it has to be grounded in the research question. When researchers create theories to direct their work, they are better able to focus their energies and remain dedicated to their goals.

STEP 4: The Research Design

The strategy for accomplishing goals and responding to research inquiries is known as the research design. It describes where to find the pertinent data. Its objectives are to formulate research questions, test hypotheses, and offer insights for making decisions.

The goal of the research design is to obtain relevant evidence with the least amount of funds, time and labor possible. This strategy falls into four groups:



STEP 5: Describe Population

Research projects typically focus on a particular population, set of resources, or application of technology in the workplace. This research group is referred to as

the population in research. The study group is determined in part by the research topic and goal.

Let's say a researcher wants to look into a particular community group of people. Under such circumstances, the study may focus on a particular age range, gender, region, or ethnic group. In order for the results of a study to be generalized, the sample or population must be specified as the last stage in the design process.

STEP 6: Data Collection

In order to get the knowledge or information needed to address the research question, data collecting is crucial. Every study project gathers data, either from the subjects or from the literature. The two types of researchers' data must be gathered. These sources might offer original information. Questionnaire for the Experiment: Observation and Interview.

The categories of secondary data are: Review of the literature, Official and unofficial accounts method, utilizing library resources.

STEP 7: Data Analysis

Data analysis is planned by the researcher during research design. The researcher gathers and examines data. In this step, the data is analyzed using the chosen methodology. The study's conclusions are examined and summarized.

Creating categories, applying these categories to raw data through coding and tabulation, and finally making statistical conclusions are only a few of the closely related steps that make up data analysis. The obtained data can be examined by the researcher using a range of statistical techniques.

STEP 8: The Report-Writing

Following these procedures, the researcher needs to write a report outlining his results. The following should be carefully considered when composing the report:

- The report's title, date, acknowledgments, and preface should all appear on the first page. Any tables, graphs, and charts that are included should be listed after the table of contents.
- The objective and techniques of the research should be stated in the introduction. The boundaries and scope of the investigation should be included in this section.
- Overview of Results: After the introduction, there will be a non-technical overview of the results and suggestions. If the findings are long, they should be condensed.
- Principal Report: The report's body should make sense and be divided into easily understood sections.
- At the conclusion of the main text, the researcher ought to restate his results. It's the thing in the end.

3.4 OBJECTIVE OF STUDY

1. To assess the effectiveness of particular mutual fund plans in india.

2. To evaluate certain mutual fund plans in India for efficacy.

3. To evaluate the risk-return relationship and market volatility of the chosen mutual funds.

4. To observe the mutual fund growth rate and project the value in the near future.

5. To research the elements influencing fund managers' decisions about investments in mutual funds.

3.5 HYPOTHESIS OF RESEARCH

1) For Average Return of Mutual Fund Schemes

(H0): There is no significant difference in the equity mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the equity mutual fund scheme's performance and their respective returns.

(H0): There is no significant difference in the debt mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the debt mutual fund scheme's performance and their respective returns.

(H0): There is no significant difference in the hybrid mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the hybrid mutual fund scheme's performance and their respective returns.

2) For Sharpe, Jensen and Treynor's Ratio of Mutual Fund Schemes

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the equity schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the equity schemes and the additional risk assumed for the scheme.

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the debt schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the debt schemes and the additional risk assumed for the scheme.

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the hybrid schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the hybrid schemes and the additional risk assumed for the scheme.

3.6 RESEARCH METHODOLOGY

The current study, "Assessing the Effectiveness of Indian Mutual Fund Schemes: A Performance Evaluation," used the following methodology:

This study aims to investigate the operation of mutual funds in India. To lay a strong theoretical platform for future research, the previous chapter featured a survey of the literature on the performance evaluation of mutual funds.

The purpose of this study is to look into how mutual funds are run in India. The prior chapter included a review of the literature on mutual fund performance evaluation in order to establish a solid theoretical foundation for upcoming studies.

3.7 TYPES OF RESEARCH

A) Descriptive Research

A sort of research methodology known as descriptive research offers a thorough explanation of the phenomenon being observed or the traits of a specific subject within a community. It aims to faithfully portray or "describe" situations, behaviors, attitudes, and other factors as they actually occur—that is, without the researcher interfering. Through the use of numerous data gathering techniques, including surveys, interviews, observations, and case studies, descriptive research

precisely documents current events in order to present a coherent picture of the situation. Descriptive research just looks at the facts in a particular scenario, as opposed to inferential research, which seeks to draw conclusions. It aids in laying a strong basis for additional research investigations.

B) Analytical Research

Analytical research aims to comprehend, interpret, or explain a phenomena or event at a deeper level than descriptive study. It entails carefully analyzing components or structures of the topic being studied, frequently with the use of computer, mathematical, or statistical methods. Analytical research aims to comprehend underlying links, causality, and effects, in contrast to descriptive research, which only observes and records. It makes a claim and tries to provide "why" and "how" answers. To get useful results or insights from analytical research, one needs a precise framework, strict methodology, and critical thinking skills. It makes it essential for informing policy and decision-making in the fields of science, business, economics, and social studies.

C) Quantitative Research

A systematic analysis of phenomena through the collection of measurable data and the application of statistical, mathematical, or computer techniques is known as quantitative research. Through the use of sampling techniques and the distribution of online questionnaires, online polls, and surveys, among other tools, quantitative research gathers statistically meaningful data from current and potential clients.

This kind of research's primary feature is its ability to present the findings numerically. It is feasible to forecast the future of a good or service, identify causal linkages (also known as Causal Research), and make adjustments in response after meticulously gathering organized observations and comprehending these figures. The main focus of quantitative research is the study of numerical

data, and inferential statistics are employed to draw conclusions that can be generalized to a larger population.

3.8 RESEARCH DESIGN

The structure that directs the investigation and establishes the guidelines for data collection, measurement, statistical tool analysis, and variance analysis is known as the research design. The research design contained a flowchart that detailed the researcher's steps, from developing the hypothesis and weighing its operational implications through doing the final data analysis.

Making decisions regarding what, when, how much, and how to undertake an investigation or study constitutes a research design. The configuration of parameters for data collection and analysis in a way that attempts to strike a balance between procedural efficiency and relevance to the study purpose is another aspect of a researcher's design. An effective researcher design is often flexible, appropriate, economical, and efficient. In this context, research that examines the possibility of a fortuitous relationship between variables is called hypothesis testing research. The researcher ensures that bias is kept to a minimum and the dependability of the data collected is maximized. Careful coding is necessary to prevent errors, and it is for this reason that the researcher's credibility may be trusted.

a) Title Of Study

"Assessing the effectiveness of Indian mutual fund schemes: A performance evaluation"

b) Study Period

The study is conducted during a three year period, from 2021 to 2023.

c) Sampling design

- **Sampling Unit:**

  The sample unit contained the Top 10 All Debt Scheme, Top 10 All Equity Scheme, and Top 10 All Hybrid Scheme.

- **Sources List:**

  For the samples, secondary sources have been acquired. It comprises the Mutual Fund Fact Sheet and magazine, Mutual Fund Insight, along with additional journals, magazines, essays, books, and publisher and unpublished records of the mutual funds.

- **Sample Size:**

  The study's sample size was as follows: Thirty designs in total have been examined in three distinct categories.

The following are their specifics.

I. Top 10 equity fund

TABLE 3.1

Sr No.	Name of Scheme
1	Icici prudential fund
2	Mahindra Manulife large cap fund
3	Nippon India large cap fund
4	Tata large cap fund
5	Aditya Birla sun life frontline equity fund
6	KOTAK emerging equity fund
7	HDFC midcap opportunities fund
8	SBI magnum midcap fund
9	AXIS midcap fund
10	Quant midcap fund

II. Top 10 debt fund

TABLE 3.2

Sr no.	Name of scheme
1	Bandhan money manager fund
2	DSP saving fund
3	INVESCO India money market fund
4	frankin India government securities fund
5	PGIM India guilt fund
6	Canara Robeco guilt fund
7	Jm low duration fund
8	Baroda bnp Paribas low duration fund
9	Tata treasury advantage fund
10	Mf low duration fund

III. Top 10 hybrid fund

TABLE 3.3

Sr no.	Name of Scheme
1	sundaram aggressive hybrid fund
2	sbi equity hybrid fund
3	PGIM India hybrid equity fund
4	UTI aggressive hybrid fund
5	INVESCO India aggressive hybrid fund
6	Hdfc hybrid debt fund
7	UTI conservative hybrid fund
8	NAVI conservative hybrid fund
9	HDFC multi asset fund
10	Sbi multi asset fund

3.9 TOOLS & TECHNIQUES FOR DATA ANALYSIS

i. Standard Deviation

The difference between the average value and the fund or benchmark returns is computed using the standard deviation. An elevated standard deviation indicated that the investment is exceedingly risky.

$$S_i = \sqrt{\frac{1}{n-1}\sum(R_i - \bar{R})^2}$$

Where, S_i= SD of the fund return

N = Number of Periods

R_I= Return on Investment

$\bar{R}$ = Average total return

Greater performance volatility in the fund and higher investment risk are indicated by a large standard deviation. A low standard deviation suggests lower investment risk and a less consistent fund performance.

ii. BETA β

The fund's sensitivity to its benchmark is referred to as its beta. Beta calculates the fund's risk. The fund is riskier, as shown by its greater beta. When the beta of a fund is less than one, it indicates that its value is less variable than the market benchmark, and when it is larger than one, it indicates that the fund's value is more volatile than the market benchmark.

FORMULA

β = Covariance (X, Y) / Variance (Y)

Where, $\beta(X,Y) = \frac{\sum(X_1-\bar{X})(Y_1-\bar{y})}{n-1}$

For research purposes, the following standards were applied to the volatile (Beta) performance requirements.

✓ **Performance Criteria of Volatile (Beta)**

TABLE 3.4

BETA VALUE	PERFORMANCE OF BETA
< 1	LESS
> 1	MORE

iii. Sharpe Ratio

American economist and Nobel laureate William F. Sharpe developed this ratio in 1966. It calculates the mutual fund's risk-adjusted returns. The ratio shows how many excess returns a risk-free asset can produce. Two mutual funds are compared using this ratio.

Not just systematic risk, but total risk is measured by the Sharpe ratio. It also explains the funds' volatility. Higher Sharpe ratios denote a higher risk and higher return on investment, whereas a lower Sharpe ratio denotes a lower risk and higher return on investment.

$$S_x = \frac{R_P - R_F}{SD}$$

Where, P = Portfolio

R_P = Average ROR of P

R_F= Risk free rate

SD = SD of R_P

For research purposes, the ensuing have been utilized to the

✓ **Performance Criteria of Sharpe Ratio**

TABLE 3.5

Sr no.	Criteria of Sharpe Ratio	Considered Performance
a	< 1	BAD
b	FROM 1 TO 1.99	GOOD
c	FROM 2 TO 2.99	VERY GOOD
d	> 3	EXELLENT

iv. Jensen Ratio

The Jensen's measure, often known as Jensen's alpha, is a risk-adjusted performance metric that shows the average return on an investment or portfolio, either above or below the return forecasted by CAPM, based on the average market return and the beta of the investment or portfolio. Another popular name for this measure is just alpha.

The term alpha is often used to refer to Jensen's measure. A manager has "delivered alpha" to their customers when they beat the market while taking on risk.

$$\text{Jensen's Alpha} = \left[R_P - \left(R_f + \beta * (R_m - R_f)\right)\right]$$

Where, R_p = Expected Portfolio return

R_F = Risk free Rate

B = Beta of portfolio

R_m = expected market return

v. Treynor Ratio

Jack Treynor is the one who first proposed the Treynor Ratio. It goes by the name of reward-to-volatility ratio as well. The returns obtained over the risk-free rate of return are expressed as a ratio. Only the systemic danger is mentioned. A higher Treynor ratio suggests that the fund is better suited for investing because it carries less systematic risk. A lower Treynor ratio suggests that the fund is unsuitable for investing due to its high systematic risk.

$$T_R = \frac{R_p - R_f}{\beta}$$

Where, R_p = Return of Portfolio

R_f = Rate of Risk Free Return

β = Portfolio Beta

ANOVA TEST:

Analysis of Variance is referred to as ANOVA. This statistical technique examines how the means of two or more groups or treatments differ from one another. It is frequently employed to ascertain whether the means of several groups differ in any statistically meaningful ways.

ANOVA contrasts the variation within the groups with the variation between the group means. There may be a considerable difference between the group means if the variation between the group means is significantly greater than the variation within the groups.

By comparing within-group variability to between-group variability, an ANOVA yields an F-statistic. The F-statistic indicates substantial variations between group means if it is greater than a certain value.

3.10 SIGNIFICANCE OF THE STUDY

A crucial financial tool that can play a significant role in any country's development is the mutual fund. A large number of financial investors may be drawn to these if they perform in a way that is both beneficial and in line with the wishes of the contributing open. These days, it's evident that the industry has seen a significant amount of popular financial plans stolen. Ordinary investors find it quite difficult to view their show. In order for the financial experts to make an accepted decision when selecting mutual funds for their investment purpose, it is crucial to evaluate the execution of the shared assets. Furthermore, it is important to understand which mutual funds are operating in accordance with regulatory standards that have been approved and whether or not find managers followed guidelines when making investment decisions. Safeguarding due diligence, openness, and security in the mutual fund industry's portfolio selection is crucial. The aim of this research is to have a more profound comprehension of the various attributes that a mutual fund has exhibited throughout time. This will facilitate the examination or evaluation process and facilitate decision-making for investors and other researchers.

3.11 SCOPE OF STUDY

When Analyze the past performance of mutual funds over a range of periods, such as one year, three years, five years, and from their start. Evaluate the mutual fund’s performance against pertinent benchmarks and within the same category (e.g., debt, equity, and hybrid funds).

Analysis of Risk-Return Determine the risk-adjusted returns of mutual funds by utilizing metrics like Jensen's alpha, Treynor ratio, and Sharpe ratio.

Analyze mutual fund performance by category, including large-cap, mid-cap, small-cap, value, and growth, as well as asset type, including equity, fixed income, and alternative. Determine the performance trends and patterns in each category.

Examine how fund managers affect the performance by doing a fund manager analysis. Examine the performance histories, investment philosophies, and alpha (excess returns) that fund managers have produced in relation to the market.

Investigate the connection between mutual fund performance, expense ratios, and management fees. Examine whether; when Fees are considered, lower-cost funds typically perform better than higher-cost funds.

Because Holdings in Portfolio and Diversification Analyze mutual fund portfolio holdings to learn about the investment philosophies and degree of diversification. Consider variables including concentration risk, asset allocation, and sector allocation assessing the performance of funds.

3.12 LIMITATION OF STUDY

1. The current study's focus on three mutual fund types and ten plans restricts the research's results.

2. The research analysis's dependency on fund schemes chosen for past performance creates restrictions on the number of funds that can be included in the study.

3. Errors could happen in the study analysis that is carried out utilizing data obtained from fund managers. It's possible that the respondents' opinions are prejudiced. One of the study's shortcomings is hence the conclusion reached based on this data.

4. Another weakness of the study is the small number of fund managers that were included.

5. The study's statistical techniques and tools aren't without limitations.

6. In addition to this, the investigation is further limited by time and resource constraints.

3.13 CHAPTERS PLAN

Chapter 1: Introduction

An outline of the research issue will be given in the introduction, along with the significance of assessing mutual fund schemes in the Indian environment. The importance of mutual funds as investment vehicles and the necessity of evaluating their efficiency in producing returns for investors will be covered. This chapter includes an overview of the paper's organization, methods, and research goals.

Chapter 2: Review of Literature

The pertinent research on mutual fund performance assessment from both the international and Indian markets will be reviewed in this chapter. It will examine several models and approaches—such as risk-adjusted measurements, market timing, and performance persistence—that are employed to evaluate mutual fund performance. The chapter will also look at earlier research on Indian mutual funds and its conclusions, emphasizing important discoveries and gaps in the body of knowledge.

Chapter 3: Research Methodology

The research strategy, data sources, and analytical methods used in the study will all be covered in the methodology chapter. It will outline the procedure for selecting the sample, together with the standards for selecting mutual fund schemes and the time frames that are taken into account. The chapter will additionally address the metrics used for performance evaluation, including Treynor's ratio, Jensen's alpha, and Sharpe ratio, as well as any modifications made for risk and other variables.

Chapter 4: Data Analysis And Interpretation

This chapter will present the findings from the performance evaluation of Indian mutual fund plans conducted using the chosen methodology. Tables, charts, and statistical analysis will be provided to illustrate the performance indicators selected for the selected funds. The chapter will also discuss any trends or patterns that are discovered in the data and examine how various other fund classifications and investing strategies performed.

Chapter 5: Summary and Conclusion Of Study

The study's main conclusions will be outlined in the final chapter, along with its contributions to the field of mutual fund performance evaluation in India. It will draw attention to the importance of the study's findings and provide closing thoughts on the efficacy of Indian mutual fund schemes. The chapter will also discuss the study's shortcomings and make suggestions for additional investigation and application.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

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4.1 INTRODUCTION

Data analysis is the process of turning data into knowledge. This approach also includes developing hypotheses on the links between variables and spotting patterns and trends in the data.

The objective of data analysis is to comprehend the meaning of the data, and then to apply that understanding to forecasts or conclusions. Through data analysis, business processes may be improved, decisions can be made more wisely, and customer behavior can be better understood.

4.2 MEANING

Data:

A. The term "data" in behavioral research refers to study results that allow for the formation of conclusions. Test results, averages, percentages, and correlation coefficients are among the frequently quantified data in these studies.

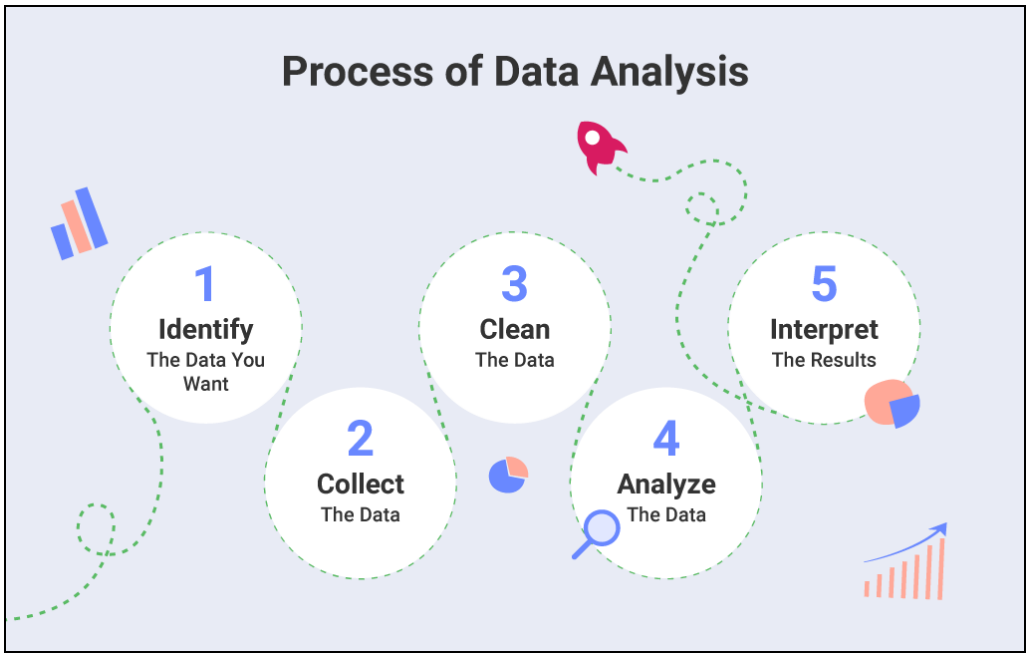
Analysis:

B. To answer research questions, data must be categorized, arranged, modified, and summarized. This process is known as analysis.

Interpretation:

C. Interpretation employs the results of analysis to draw conclusions and draw inferences about the research relations under investigation.

4.3 DATA INTERPRITATION: WHAT IS IT?



(Source: medium.com)

The practice of applying various analytical techniques to make sense of a processed data collection is known as data interpretation. To summarize the information, the acquired data must be analyzed because it may be presented in a variety of formats, including bar graphs, pie and line charts, histograms, tabular representations, and more. The reason of data interpretation is to assist individuals in analyzing gathered data and comprehending numeric data that has been gathered and shown. The significance of interpreting data is abundantly evident. Data interpretation is a subjective process that differs throughout businesses.

4.4 IMPORTANCE OF DATA INTERPRETATION

The importance less of various data processing is closely related to the importance of data interpretation. Proper data interpretation, such data normalization and data quality comprehension, delivers more in-depth insights and real-time solutions than it does without them. In particular, data interpretation can aid with trend prediction, data outlier detection, hidden correlation discovery between datasets, and improved data identification.

4.5 AVERAGE RETURNS OF MUTUAL FUND SCHEMES

4.5.1 Average Returns of Equity Funds

Table 4.1 Average Returns of Equity Funds

Sr no.	Name Of Sachems	2021	2022	2023	average return
1	Icici prudential blue chip fund	27.86	6.85	27.39	20.7
2	Mahindra Manulife largecap fund	28.01	1.89	21.01	16.97
3	Nippon India large cap fund	30.4	11.33	32.15	24.63
4	Tata large cap fund	31.17	3.31	23.84	19.44
5	Aditya Birla sun life frontline equity fund	26.38	3.54	23.07	17.66
6	Kotak emerging equity fund	44.28	5.13	30.54	26.65
7	HDFC midcap opportunities fund	36.76	12.29	42.8	30.62
8	SBI magnum midcap fund	48.66	3.04	33.37	28.36
9	Axis midcap fund	29.59	-5.07	20.59	15.04
10	Quant midcap fund	46.89	17.13	32.43	32.15

Interpretation:

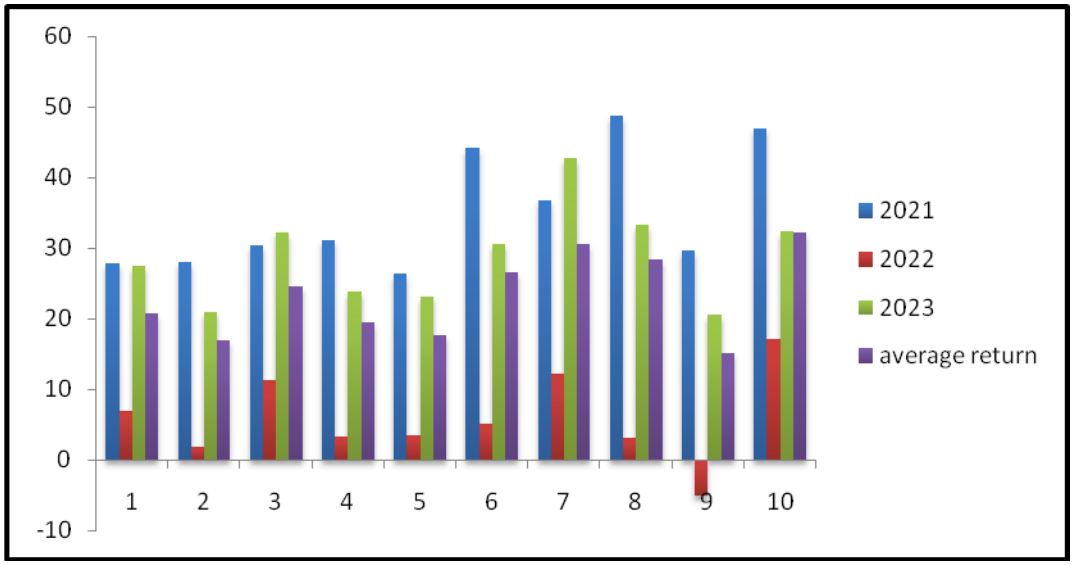
1. Scheme 1st with returns of 27.39% and 27.86% in 2021 and 2023, respectively, this product demonstrated exceptional performance. Its returns in 2022 were; however, lower at 6.85%, generating an average return of 20.7%.

2. Mahindra Manulife Largecap Fund: This fund had returns that were very stable over the course of the three years, with a peak return of 28.01% in 2021 and a minimum return of 1.89% in 2022. Over the time, the average return has been 16.97%.

3. Nippon India Largecap Fund: This fund had impressive results in 2021, 2022, and 2023, returning 30.4%, 11.33%, and 32.15%, respectively. It yields a 24.63% average return.

4. Tata Largecap Fund: With returns of 31.17%, 3.31%, and 23.84% in 2021, 2022, and 2023, respectively, this fund likewise showed steady performance over the course of the three years. It yields a 19.44% average return.

Chart: 4.1: Average Returns Of Equity Funds



5. Aditya Birla Sun Life Frontline Equity fund: With an average return of 17.66% throughout the course of the years, this product produced decent returns. In 2021, it provided the maximum return of 26.38%.

6. Kotak Emerging Equity Fund: With an average return of 26.65%, this fund outperformed all other listed funds. With returns of 44.28% and 30.54% in 2021 and 2023, respectively, it demonstrated impressive performance.

7. HDFC Mid Cap Opportunities fund: With a return of 42.8% in 2023, this product demonstrated notable growth. Over a three-year period, its average return has been 30.62%.

8. SBI Magnum Midcap Fund: With gains of 48.66% in 2021, this fund had the best return of any fund; returns in subsequent years were lower. It has a 28.36% average return.

9. Axis Midcap Fund: The average return of this fund was 15.04% in 2022 due to its negative return of -5.07%.

10. Quant Midcap Fund: With returns of 32.43% and 46.89% in 2021 and 2023, respectively, this fund demonstrated impressive performance over the course of the three years. 32.15% is its average return.

ANOVA TEST:

(H0): There is no significant difference in the equity mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the equity mutual fund scheme's performance and their respective returns.

Table 4.2: ANOVAs Single Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4674.68	2	2337.34	43.73	3.397E-09	3.354
Within Groups	1442.97	27	53.44			
Total	6117.64	29				

Interpretation:

The above table, which saw that the F-critical Value is 3.354 and the F calculated Value is 43.73, is where the researcher identified the "F" test one-way ANOVA. The researcher has rejected the null hypothesis and determined that there is a significant difference in the average returns of the several selected mutual funds over the study. The p is 3.397E, which is less than the significance value of 0.05.

4.5.2 Average Returns of Debt Schemes

Table 4.3: Average Returns of Debt Schemes

Sr no.	Name Of Schemes	2021	2022	2023	average return
1	Bandhan money manager fund	2.92	4.02	6.66	4.53
2	DSP saving fund	3.62	3.97	7.06	4.88
3	INVESCO India money market fund	3.51	3.9	6.99	4.80
4	frankin India government securities fund	2.7	4.49	5.53	4.24
5	PGIM India guilt fund	2.81	1.79	6.62	3.74
6	Canara Robeco guilt fund	2.51	3	7.02	4.18
7	JM low duration fund	3.08	4.08	6.57	4.58
8	Baroda bnp Paribas low duration fund	3.29	3.74	6.67	4.57
9	Tata treasury advantage fund	3.58	4.07	6.79	4.81
10	LIC mf low duration fund	3.71	3.84	6.47	4.67

Interpretation:

1. Bandhan Money Manager Fund: • Over the course of the three years, this fund has grown consistently, yielding higher returns every year.
    - The returns are as follows: 2.92% in 2021, 4.02% in 2022, and 6.66% in 2023.
    - This fund has an average return of 4.53%.

2. DSP Savings Fund: The returns on this fund have increased steadily over time.
    - In 2021, returns are 3.62%; in 2022, they rise to 3.97%; in 2023, they reach 7.06%.
    - This fund has an average return of 4.88%.

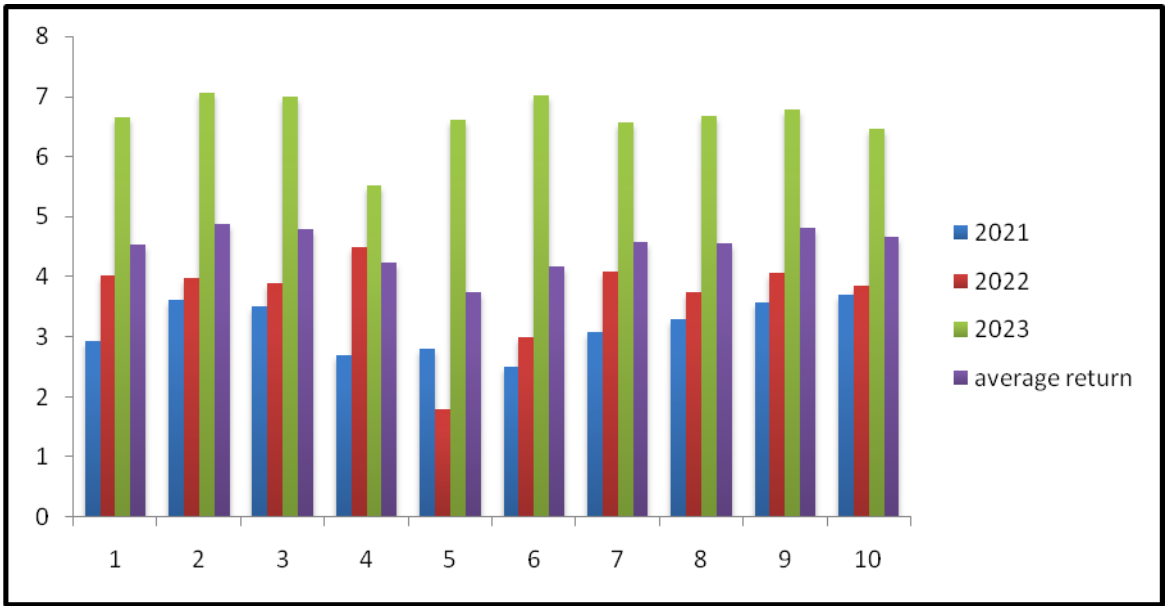
3. INVESCO India Money Market Fund: This fund exhibits steady return growth, much like the earlier ones.
    - In 2021, returns are 3.51%; in 2022, they increase to 3.90%; in 2023, they reach 6.99%.
    - This fund has an average return of 4.80%.

4. Franklin India Government Securities Fund: The returns on this fund are little less than of the previous ones.
    - In 2021, the return is 2.70%; in 2022, it rises to 4.49%; and in 2023, it falls marginally to 5.53%.
    - This fund has an average return of 4.24%.

5. PGIM India Guilt Fund: •Over time, this fund has had inconsistent returns.
    - In 2021 it is 2.81%; in 2022 it falls to 1.79%; and in 2023 it rises to 6.62%.
    - This fund has an average return of 3.74%.

6. Canara Robeco Guilt Fund: This fund displays return variations much like the prior one did.
    - In 2021, returns are 2.51%; in 2022, they rise to 3.00%; in 2023, they reach 7.02%.
    - This fund has an average return of 4.18%.

Chart: 4.2: Average Returns Of debt Funds



7. JM Low Duration Fund: The returns on this fund have increased steadily over time.
    - In 2021, returns are 3.08%; in 2022, they rise to 4.08%; and in 2023, they reach 6.57%.
    - This fund has an average return of 4.58%.

8. Baroda BNP Paribas Low Duration Fund: Consistently growing returns, this fund is comparable to JM Low Duration Fund.
    - In 2021, returns are 3.29%; in 2022, they rise to 3.74%; in 2023, they reach 6.67%.
    - This fund has an average return of 4.57%.

9. Tata Treasury Advantage investment: The returns on investment have increased steadily over time.
    - In 2021, returns are 3.58%; in 2022, they rise to 4.07%; and in 2023, they reach 6.79%.
    - This fund has an average return of 4.81%.

10. LIC MF Low Duration investment: over time, returns from this investment have consistently increased.
    - In 2021, returns are 3.71%; in 2022, they rise to 3.84%; in 2023, they marginally decline to 6.47%.
    - This fund has an average return of 4.67%.

ANOVA TEST:

(H0): There is no significant difference in the dept mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the dept mutual fund scheme's performance and their respective returns.

Table 4.4: ANOVA Single Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	69.88	2	34.94	108.92	1.18E-13	3.35
Within Groups	8.66	27	0.32			
Total	78.54	29				

Interpretation:

The above table, which indicates that the F-critical Value is 3.35 and the F calculated Value is 108.92, is where the researcher identified the "F" test one-way ANOVA. The researcher has rejected the null hypothesis and determined that there is a significant difference in the average returns of the several selected mutual funds over the study period. The p value is 1.18E, which is less than the significance value of 0.05.

4.5.3 Average Returns of hybrid Schemes

Table 4.5: Average Returns of Hybrid Schemes

Sr no.	Names Of Scheme	2021	2022	2023	average return
1	Sundaram aggressive hybrid fund	24.13	3	16.34	14.5
2	Sbi equity hybrid fund	22.24	2.27	15.84	13.5
3	PGIM India hybrid equity fund	21.34	-3.86	16.94	11.5
4	UTI aggressive hybrid fund	28.94	5.64	25.45	20.0
5	INVESCO India aggressive hybrid fund	19.62	-0.88	23.36	14.0
6	HDFC hybrid debt fund	12.98	6	13.78	10.9
7	UTI conservative hybrid fund	12.66	3.32	11.01	9.0
8	Navi conservative hybrid fund	5.68	3.03	7.15	5.3
9	HDFC multi asset fund	17.28	4.34	17.68	13.1
10	Sbi Multi Asset Allocation Fund	12.13	5.98	23.65	13.9

Interpretation:

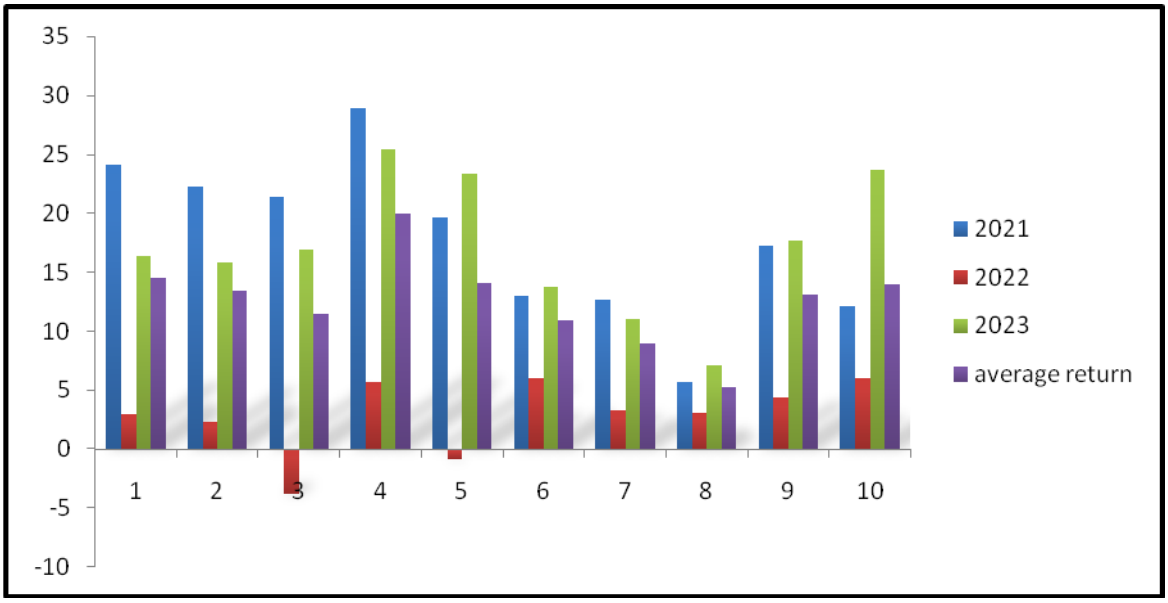
1. Sundaram Aggressive Hybrid Fund: Throughout the course of the three years, this fund has consistently produced positive returns, with 2021 seeing the largest return. With an average return of 14.5%, the performance was rather steady.

2. SBI Equity Hybrid Fund: This fund, like Sundaram, has shown steady gains over the past three years, with the largest return being in 2021. 13.5% is the average return.

3. PGIM India Hybrid Equity Fund: This fund recovered in 2023 after seeing a negative performance in 2022. Its average return is 11.5% even with the negative return year.

4. UTI Aggressive Hybrid Fund: This fund has shown solid gains over the last three years, with 2021 seeing the most return. At 20.0%, it has the greatest average return of all the listed funds.

Chart: 4.3: Average Returns Of hybrid Funds



5. INVESCO India Aggressive Hybrid Fund: The fund saw a large increase in 2023 despite having a negative return in 2022. It yields a 14.0% average return.

6. This sixth scheme has demonstrated reasonable returns over the course of three years, with no year exhibiting negative returns. But at 10.9%, its average return is comparatively lower than that of certain other funds.

7. UTI Conservative Hybrid Fund: With an average return of 9.0%, UTI Conservative Hybrid Fund has comparatively lesser returns when compared to other hybrid funds.

8. Navi Conservative Hybrid Fund: This fund is among the worst in terms of average return, exhibiting moderate gains with an average return of 5.3%.

9. HDFC Multi Asset Fund: Over the past three years, the HDFC Multi Asset Fund has consistently produced positive returns, with 2023 seeing the largest gain. 13.1% is its average return.

10. SBI Multi Asset Allocation product: With a comparatively high average return of 13.9%, this product exhibits outstanding gains, especially in 2023.

Overall Analysis:

- Sundaram, SBI Equity, and HDFC Multi Asset Fund are among the funds that show persistent positive returns with generally stable performance.

- UTI Aggressive Hybrid Fund is the fund that performs best overall, with the greatest average return.

- The INVESCO India Aggressive Hybrid Fund and the PGIM India hybrid equity fund both saw losses in their first several years before making a comeback.

- Compared to aggressive hybrid and multi-asset funds, conservative hybrid funds such as UTI Conservative and Navi Conservative Hybrid Funds have lesser returns.

- Before making an investment, investors should evaluate the risk-return profile of each fund and match it to their investment goals and risk tolerance.

ANOVA TEST:

(H0): There is no significant difference in the hybrid mutual fund scheme's performance and their respective returns.

(H1): There is significant difference in the hybrid mutual fund scheme's performance and their respective returns.

Table 4.6: ANOVA Single Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1408.38	2.00	704.19	23.21	1.37E-06	3.35
Within Groups	819.30	27.00	30.34			
Total	2227.68	29.00				

Interpretation:

The above table, which indicates that the F-critical Value is 3.35 and the F calculated Value is 23.21, is where the researcher identified the "F" test one-way ANOVA. The researcher has rejected the null hypothesis and determined that there is a significant difference in the average returns of the several selected mutual funds over the study period. The p value is 1.37E, which is less than the significance value of 0.05.

4.6 SHARPE, JENSEN AND TREYNOR'S RATIO OF MUTUAL FUND SCHEMES

4.6.1 Sharpe, Jensen and Treynor's Ratio for Equity Schemes Fund

Table No. 4.7 Sharpe, Jensen and Treynor's Ratio for Equity Schemes Fund

Sr no.	Name Of Sachems	Standard deviation	β(beta)	sharp ratio	Jensen ratio	Treynor's ratio
1	ICICI peerudential blue chip fund	12.62	0.89	1	4.07	0.14
2	Mahindra Manulife largecap fund	13.3	0.97	0.62	-0.82	0.09
3	Nippon India largecap fund	14.07	0.99	1.05	4.7	0.15
4	Tata largecap fund	13.25	0.94	0.75	1	0.11
5	Aditya Birla sun life frontline equity fund	13.12	0.93	0.73	0.64	0.1
6	Kotak emerging equity fund	13.16	0.79	1.07	-0.73	0.18
7	HDFC midcap opportunities fund	14.82	0.9	1.35	3.22	0.22
8	SBI magnum midcap fund	13.89	0.81	1.1	0.01	0.19
9	Axis midcap fund	13.41	0.89	0.83	-3.4	0.14
10	Quant midcap fund	17.85	1.01	1.47	7.5	0.26

Interpretation

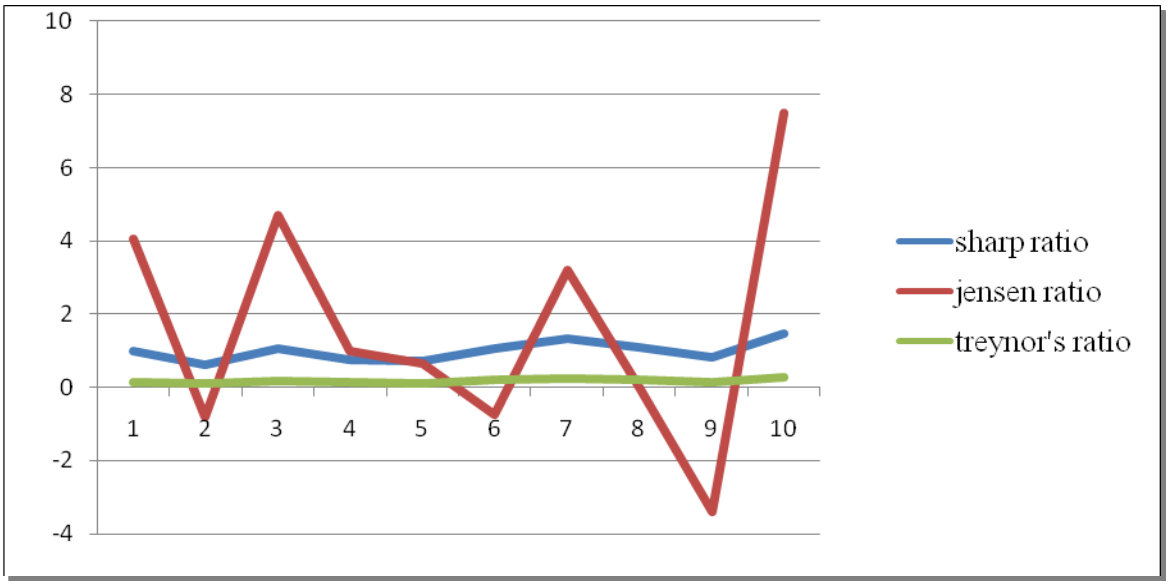
- This 1st fund has the following ratios: Treynor's Ratio: 0.14; Jensen Ratio: 4.07; Sharpe Ratio: 1. this fund has a high Sharpe ratio, which indicates strong risk-adjusted returns. Additionally, the fund has surpassed its predicted return given its risk exposure, according to the remarkably high Jensen ratio. Despite being encouraging, Treynor's ratio is rather mild.

- Mahindra Manulife Largecap Fund exhibits the following ratios: Sharpe Ratio of 0.62, Jensen Ratio of -0.82, and Treynor's Ratio of 0.09. The fund's lower Sharpe ratio suggests that its risk-adjusted returns are considerably lower. Given its risk, the fund may have underperformed as indicated by the negative Jensen ratio. Despite being favorable, Treynor's ratio is not very high.

- Nippon India Largecap Fund has the following ratios: Treynor's Ratio: 0.15; Jensen Ratio: 4.7; Sharpe Ratio: 1.05. These values show that the fund has a decent risk-adjusted performance profile. Given the high Jensen ratio, it appears that the fund has surpassed the predicted return. The ratio of Treynor is moderately positive.

- Tata Largecap Fund exhibits a moderate Sharpe ratio of 0.75, signifying moderate risk-adjusted returns. It also has a Jensen Ratio of 1 and a Treynor's Ratio of 0.11. According to the Jensen ratio, the fund's performance is consistent with its anticipated return. Despite being favorable, Treynor's ratio is not very high.

Chart: 4.4 Sharpe, Jensen and Treynor's Ratio for Equity Schemes Fund



- This 5th Fund has the following ratios: Treynor's Ratio: 0.1; Jensen Ratio: 0.64; Sharpe Ratio: 0.73. This fund has a comparatively lower Sharpe ratio, which denotes lower risk-adjusted returns. The fund's performance appears to be marginally below its anticipated return, according to the Jensen ratio. Despite being favorable, Treynor's ratio is not very high.

- Kotak Emerging Equity Fund has the following ratios: Treynor's Ratio: 0.18; Jensen Ratio: -0.73; Sharpe Ratio: 1.07. This fund has a moderate Sharpe ratio, which suggests modest risk-adjusted returns. Nonetheless, it appears that the fund underperformed its anticipated return given the negative Jensen ratio. Despite being positive, Treynor's ratio is somewhat moderate.

- HDFC mid Cap Opportunities Fund has the following ratios: Treynor's Ratio: 0.22; Jensen Ratio: 3.22; Sharpe Ratio: 1.35. The fund's high ratio indicates that the risk-adjusted returns are favorable. Given the high Jensen ratio, it appears that the fund has surpassed the predicted return. Treynor's ratio is comparatively high and positive.

- SBI Magnum Midcap Fund exhibits a modest Sharpe ratio of 1.1, indicating moderate risk-adjusted returns. It also has a Jensen Ratio of 0.01 and a Treynor's Ratio of 0.19. The Jensen ratio indicates that the performance of the fund is nearly in line with its anticipated return. The ratio of Treynor is moderately positive.

- Axis Midcap Fund has the following ratios: Treynor's Ratio: 0.14; Jensen Ratio: -3.4; Sharpe Ratio: 0.83. These values suggest that the fund has reasonable risk-adjusted returns. The fund, however, appears to have substantially underperformed its predicted return, as indicated by the negative Jensen ratio. Despite being favorable, Treynor's ratio is not very high.

- Treynor's Ratio: 0.26; Sharpe Ratio: 1.47; Jensen Ratio: 7.5; Quant Midcap Fund: The fund's high Sharpe ratio suggests that its risk-adjusted returns are positive. The fund has clearly surpassed its projected return, as indicated by the extraordinarily high Jensen ratio. Treynor's ratio is comparatively high and positive.

All things considered, risk-adjusted returns and performance are thought to be superior for funds with higher Treynor's, positive Jensen, and Sharpe ratios. Prior to making any investing decisions, investors should think about their risk tolerance, investment objectives, and other aspects.

ANOVA TEST:

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the equity schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the equity schemes and the additional risk assumed for the scheme.

Table 4.8: ANOVA Single Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	10.75	2	5.38	1.55	0.23	3.35
Within Groups	93.93	27	3.48			
Total	104.68	29				

Interpretation

The research compares variations within groups to variations between groups, in this case, mutual fund schemes.

The assumption used in the ANOVA null hypothesis is that there is no discernible difference between the group means. The idea that there is a substantial difference is the alternative hypothesis.

The variance within groups is compared to the variance between groups using the F-statistic (1.55). The H0 is rejected if the F-statistic is higher than the crucial F-value (3.35) at a specified significance level (often 0.05), showing that at least one group mean differs significantly from the others.

The F-statistic in this instance has a P-value of 0.23. The P-value above the conventional significance level of 0.05, hence the null hypothesis cannot be rejected. This implies that there is insufficient data to draw the conclusion that the mutual fund schemes' means differ significantly from one another. In conclusion, the analysis's mutual fund schemes' performance (as measured by Treynor's ratio, Jensen's ratio, and Sharpe ratio) does not differ statistically significantly, according to the ANOVA results.

4.6.2 Sharpe, Jensen and Treynor's Ratio for Debt Schemes Fund

Table 4.9 Sharpe, Jensen and Treynor's ratio for debt schemes fund

Sr no.	Name Of Schemes	sd	β(beta)	sharp ratio	Jensen ratio	Treynor's ratio
1	Bandhan money manager fund	0.35	1.67	-6.09	0.32	-0.01
2	DSP saving fund	0.44	0.27	-3.97	-1.41	-0.06
3	INVESCO India money market fund	0.44	2.07	-4.18	1.2	-0.01
4	Frankin India government securities fund	1.63	0.21	-1.51	-2.29	-0.12
5	PGIM India guilt fund	1.73	0.43	-1.09	-1.38	-0.04
6	Canara Robeco guilt fund	1.78	0.53	-0.8	-0.8	-0.03
7	JM low duration fund	0.38	1.71	-5.29	0.49	-0.01
8	Baroda bnp Paribas low duration fund	0.48	1.06	-4.21	-0.87	-0.02
9	Tata treasury advantage fund	0.45	1.96	-3.93	1.12	-0.01
10	LIC mf low duration fund	0.4	1.82	-5.33	0.55	-0.01

Interpretation

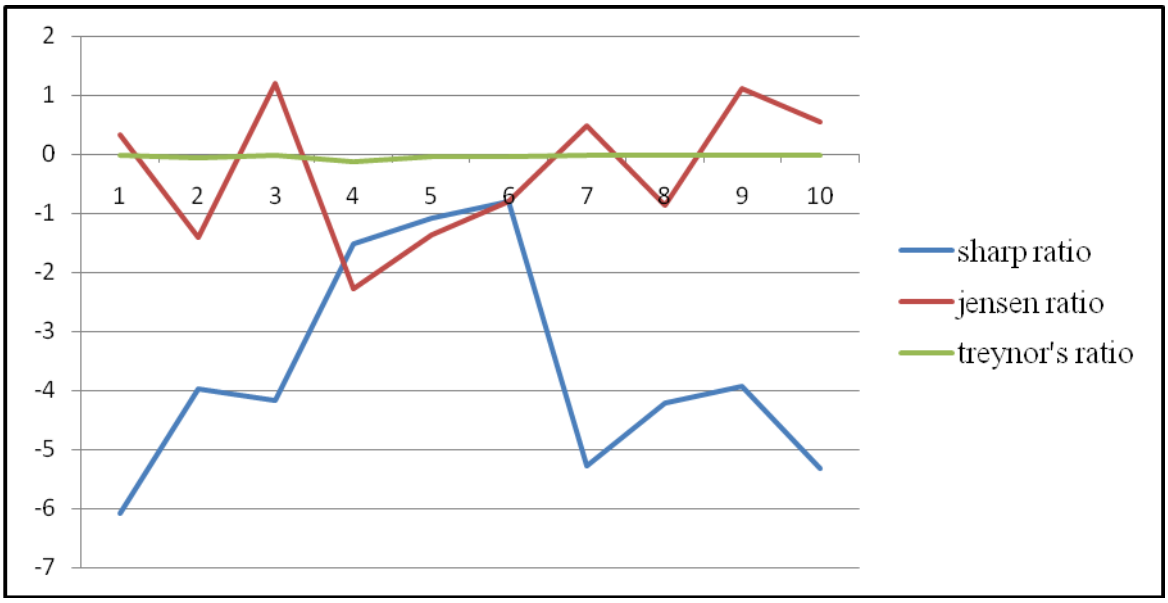
- The Bandhan Money Manager Fund exhibits the following ratios: -0.01 Treynor's Ratio, 0.32 Jensen Ratio, and a very negative Sharpe ratio, all of which point to the fund's subpar risk-adjusted returns. On the other hand, its positive Jensen ratio indicates that it has done better than the CAPM model's predicted return. Given that Treynor's ratio is marginally negative; the fund's excess returns are not making up for its systemic risk.

- The DSP Saving Fund exhibits the following ratios: Sharpe: -3.97; Jensen: -1.41; Treynor's Ratio: -0.06. The analysis reveals that the fund's Sharpe ratio is negative, signifying inadequate risk-adjusted returns. In relation to its anticipated

return, underperformance is indicated by a negative Jensen ratio. Negative excess returns in relation to systematic risk are also shown by Treynor's ratio.

- INVESCO India Money Market Fund: Treynor's Ratio: -0.01; Sharpe Ratio: -4.18; Jensen Ratio: 1.2; Analysis: This fund offers below-average risk-adjusted returns due to its negative Sharpe ratio. On the other hand, a positive Jensen ratio indicates that it has performed better than the market. Since Treynor's ratio is nearly equal to zero, the excess return is essentially commensurate with systematic risk.

Chart 4.5 Sharpe, Jensen and Treynor's ratio for debt schemes fund



- The Franklin India Government Securities Fund exhibits the following metrics: a negative Sharpe ratio of -1.51, a suboptimal risk-adjusted return of -2.29, a Jensen ratio of -2.29, and a Treynor's ratio of -0.12. The negative values of Jensen and Treynor's ratios indicate underperformance in relation to market returns and systematic risk.

- The PGIM India Gilt Fund has the following ratios: Sharpe: -1.09; Jensen: -1.38; Treynor's Ratio: -0.04; Analysis: This fund, like the Franklin India Government Securities Fund, shows underperformance in terms of risk-adjusted returns as well as when compared to market benchmarks.

- Canara Robeco Gilt Fund: -0.8 for Sharpe, -0.8 for Jensen, and -0.03 for Treynor's Ratio; Analysis: All of these ratios are negative for this fund, indicating below-

average performance and insufficient returns in comparison to market benchmarks and systemic risk.

- JM Low Duration Fund: -0.01 Treynor's Ratio; Jensen Ratio; 0.49 Sharpe; Analysis: The fund has a significantly negative Sharpe ratio, which suggests subpar risk-adjusted returns. On the other hand, a positive Jensen ratio indicates that it has performed better than the market. Treynor's ratio is marginally negative, suggesting that systematic risk is not being sufficiently offset by excess returns.

- This 8th Fund exhibits negative ratios in all categories, suggesting below-average performance when it comes to risk-adjusted returns and when compared to market benchmarks. The sharp ratio is -4.21, the Jensen ratio is -0.87, and the Treynor's ratio is -0.02.

- Tata Treasury Advantage Fund: The fund shows a negative Sharpe ratio, showing poor risk-adjusted returns. Jensen Ratio: 1.12; Treynor's Ratio: -0.01; Sharpe ratio: -3.93. On the other hand, a positive Jensen ratio indicates that it has performed better than the market. Since Treynor's ratio is nearly equal to zero, the excess return is essentially commensurate with systematic risk.

- The LIC MF Low Duration Fund exhibits negative ratios across all metrics, which, like those of other low duration funds, indicates below-average performance when it comes to risk-adjusted returns and when compared to market benchmarks. The fund's sharp ratio is -5.33, its Jensen ratio is 0.55, and its Treynor's ratio is -0.01.

In conclusion, the research shows that the majority of the funds are underperforming both in relation to their projected returns derived from market benchmarks (Jensen ratios) and in terms of risk-adjusted returns (as shown by negative Sharpe ratios). Treynor's ratios imply that systematic risk is not being sufficiently offset by excess returns. It can be necessary for investors to reconsider their selections and take into account different approaches or choices.

ANOVA TEST:

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the debt schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the debt schemes and the additional risk assumed for the scheme.

Table 4.10: ANOVA Single factor

Source of Variation	***SS***	***df***	***MS***	***F***	***P-value***	***F crit***
Between Groups	80.67	2	40.34	24.51	8.53E-07	3.35
Within Groups	44.44	27	1.65			
Total	125.11	29				

A substantial portion of the total variation is explained by the variation within the groups, also referred to as the treatment groups. The enormous F-value and extremely small p-value (far smaller than the traditional significance criterion of 0.05) provide evidence for this. The ratio of variance within groups to variance between groups is known as the F-value. We reject the null hypothesis and come to the conclusion that there are notable variations between the groups since the calculated F-value is significantly higher than the crucial F-value.

Compared to the variation between groups, the variation within the groups, or error variance, is comparatively smaller. This implies that the observed variations among the groupings indicate genuine distinctions between them instead of being the result of sampling variability or random chance.

This is the overall variation in the data set, which is the culmination of the variations within and across groups.

4.6.3 Sharpe, Jensen and Treynor's ratio for debt schemes fund

Table no 4.11 Sharpe, Jensen and Treynor's ratio for debt schemes fund

Sr no.	Names Of Scheme	sd	β(beta)	sharp ratio	Jensen ratio	Treynor's ratio
1	Sundaram aggressive hybrid fund	10.02	1.07	0.72	-0.08	0.07
2	Sbi equity hybrid fund	9.17	0.96	0.59	-1.1	0.06
3	PGIM India hybrid equity fund	10.64	1.08	0.36	-3.45	0.04
4	UTI aggressive hybrid fund	10.24	1.08	1.02	3.11	0.1
5	INVESCO India aggressive hybrid fund	9.9	1.03	0.67	-0.38	0.06
6	Hdfc hybrid debt fund	3.65	1.01	1.07	3.28	0.04
7	UTI conservative hybrid fund	3.71	1.07	0.7	1.93	0.02
8	NAVI conservative hybrid fund	2.99	0.74	-0.41	-1.68	-0.02
9	HDFC multi asset fund	6.95	1.81	0.94	5.37	0.04
10	Sbi multi asset allocation fund	6.62	0.72	1.05	3.31	0.1

Interpretation

1) Sundaram Aggressive Hybrid Fund: This fund has a good risk-adjusted return of 0.72, which is indicative of a moderate Sharp ratio.
   - Given its degree of systematic risk, the fund's performance appears to be below expectations based on the negative Jensen ratio (-0.08).
   - There is some excess return per unit of systematic risk, as indicated by the positive Treynor's ratio of 0.07.

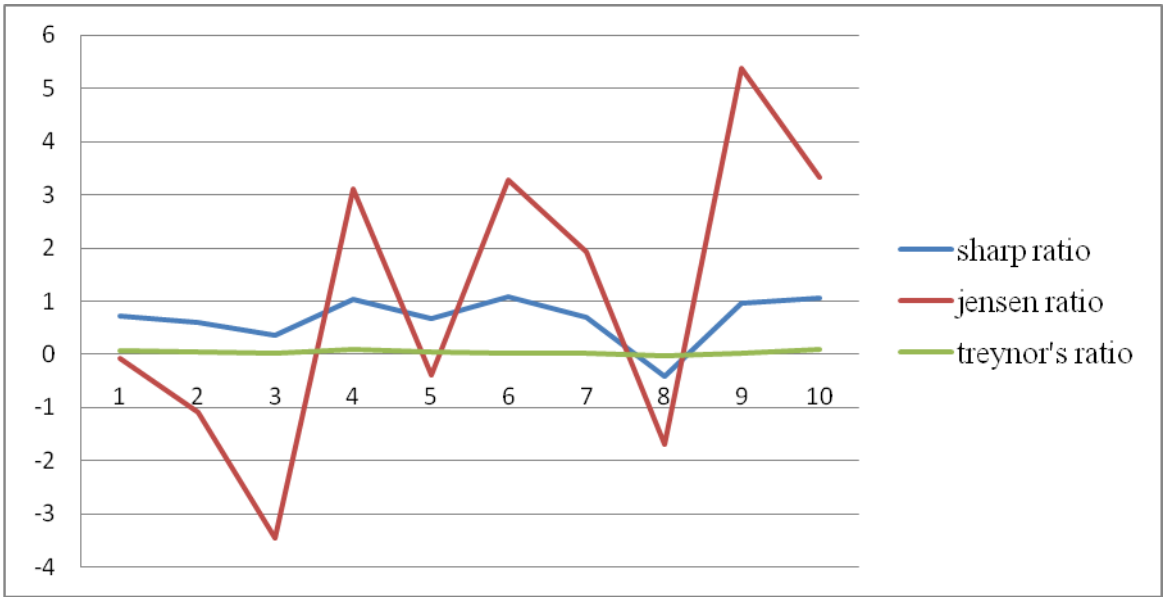
2) SBI Equity Hybrid Fund: • A moderate risk-adjusted return is shown by the fund's 0.59 of Sharp ratio.
   - Considerable underperformance in comparison to the projected return is indicated by a significantly negative Jensen ratio (-1.1).
   - Treynor's ratio is likewise low, at 0.06, meaning that returns are comparatively lower given the degree of systematic risk.

3) PGIM India Hybrid Equity Fund: Compared to other schemes, this fund has a lower risk-adjusted return due to its comparatively low Sharp ratio of 0.36.

- The extremely low Jensen ratio (-3.45) indicates a substantial underperformance in comparison to the predicted return.
- At 0.04, the Treynor's ratio suggests a restricted excess return for every unit of systematic risk.

4) UTI Aggressive Hybrid Fund: This fund shows a comparatively high risk-adjusted return with a Sharp ratio of 1.02.
   - There has been a notable outperformance in comparison to the projected return, as indicated by the positive Jensen ratio (3.11).
   - A Treynor's ratio of 0.1 indicates that returns are comparatively better given the degree of systematic risk.

Chart: 4.6 Sharpe, Jensen and Treynor's ratio for debt schemes fund



5) INVESCO India Aggressive Hybrid Fund: A moderate risk-adjusted return is shown by the fund's 0.67 of Sharp ratio.
   - Underperformance in relation to expected return is indicated by a negative Jensen ratio (-0.38).
   - For every unit of systematic risk, a limited excess return is indicated by a Treynor's ratio of 0.06.

6) HDFC Hybrid Debt Fund: This fund has a high risk-adjusted return of 1.07, which is indicative of a solid return.

- The 3.28 Jensen ratios indicate a notable outperformance in comparison to the expected return.
- Treynor's ratio is 0.04; this suggests that there is little additional return for every unit of systematic risk.

7) UTI Conservative Hybrid Fund: • A moderate risk-adjusted return is indicated by the Sharp ratio of 0.7.
    - A substantial outperformance in comparison to the predicted return is indicated by a positive Jensen ratio (1.93).
    - For every unit of systematic risk, a limited excess return is indicated by a Treynor's ratio of 0.02.

8) Navi Conservative Hybrid Fund: • This fund has a poor risk-adjusted return, as indicated by its negative Sharp ratio (-0.41).
    - The extremely low Jensen ratio (-1.68) indicates a significant underperformance in comparison to the predicted return.
    - There is a minimal excess return per unit of systematic risk, as indicated by the Treynor's ratio, which is likewise negative (-0.02).

9) The HDFC Multi Asset Fund exhibits a relatively robust risk-adjusted return, as indicated by its Sharp ratio of 0.94.
    - The Jensen ratio of 5.37 signifies a noteworthy outperformance in comparison to the anticipated return.
    - A restricted excess return per unit of systematic risk is indicated by the Treynor's ratio of 0.04.

10) SBI Multi Asset Allocation product: • With a high Sharp ratio of 1.05, this product shows a comparatively robust performance after adjusting for risk.
    - The 3.31 Jensen ratios indicate a notable outperformance in comparison to the expected return.
    - A Treynor's ratio of 0.1 indicates that returns are comparatively better given the degree of systematic risk.

Overall Analysis: Among the mentioned schemes, the UTI Aggressive Hybrid Fund, the hdfc hybrid fund, and the sbi multi asset allocation Fund have had relatively strong performance on a number of metrics, indicating that they could be attractive options for investors.

Investors should weigh these metrics alongside other considerations like investment objectives, risk tolerance, and market conditions before making investment decisions. Funds such as 3rd and 8th fund show poor performance overall, indicating they may not be favorable investment choices. Furthermore, historical success might not predict future outcomes, which is why it's critical to continuously analyze fund performance.

ANOVA TEST:

(H0): The Sharpe, Jensen, and Treynor ratios for the study period indicate that there is no statistically significant difference between the performance of the hybrid schemes and the additional risk assumed for the scheme.

(H1): The Sharpe, Jensen, and Treynor ratios during the study period suggest a statistically significant difference between the performance of the hybrid schemes and the additional risk assumed for the scheme.

Table 4.12: ANOVA Single Factor

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	4.91	2	2.46	0.93	0.41	3.35
Within Groups	71.19	27	2.64			
Total	76.10	29				

The means of the groups under comparison do not appear to differ statistically significantly, according to the ANOVA results. We are unable to reject the null hypothesis since the p-value (0.41) is higher than the selected significance level of 0.05. This indicates that any observed variations in the group means are probably

not the result of the independent variable acting in a systematic way, but rather of chance or random variation.

Practically speaking, the data does not support the conclusion that any one therapy is better or worse than the others in terms of the measured outcome if the groups reflect distinct treatments or conditions. To uncover factors that influence the outcome variable or to draw valid conclusions, more research or experimentation may be required.

As a result, even if there are differences between the groups, the ANOVA test results indicate that these differences are not statistically significant.

CHAPTER: 5

SUMMARY AND CONCLUSION OF STUDY

INDEX

5.1 SUMMARY OF STUDY

Chapter 1 Introduction Of Mutual Fund

A professionally managed investment vehicle that pools the money of several individuals to buy securities is called a mutual fund. Though the phrase "mutual fund" has no official definition, it is most usually linked with open-end investment companies, which are regulated collective investment vehicles that are regularly offered for sale to the general public. They are sometimes referred to as "investment companies" or "registered investment companies." The main distinction between hedge funds and mutual funds is that the latter cannot be made available to the general public. Before mutual funds began to soar in the late 1980s and early 1990s, they were a minor participant in the economy. These days, nevertheless, they are quite important in determining the value of tradable assets such as bonds and stocks.

As a result, the first chapter provides a conceptual explanation of the significance of mutual funds and their many decades of success in the Indian economy.

Chapter 2 Literature Review

Research on the performance of mutual funds has expanded significantly. For an extended period, the Treynor Index, Jenson Model, Sharpe Ratio, and Fama Model have been employed as metrics for assessing portfolio performance. This job is ex-post, meaning it was filled after the term ended.

Chapter 3 Research Methodology

Research is often defined as the process of acquiring new knowledge. Research can also be defined as a systematic, scientific search for pertinent information on a certain topic. In actuality, research is a form of creative scientific investigation.

According to Clifford Woody, carrying out research comprises defining and redefining issues, developing theories or prospective solutions, obtaining, compiling, and evaluating

data, coming to conclusions, and then closely examining those conclusions to determine whether or not they corroborate the initial idea.

This chapter covers the study's overall research design, which covers the goal of the investigation, its duration, the kinds of data it used, how it was collected, and how it was analyzed and interpreted.

Chapter 4 Data Analysis and Interpretation

We Are Doing Analysis Helping With This Techniques

1. Sharpe ratio

William F. Sharpe created the Sharpe ratio, often known as Sharpe's measure, which is the ratio of the total return of a portfolio less the risk-free rate divided by the portfolio's standard deviation, which represents the risk of the portfolio. The risk premium per unit of risk, which is determined by the portfolio's standard deviation, is what is known as the Sharpe ratio.

$$S_x = \frac{R_P - R_F}{SD}$$

Since a risk-free asset, like a T-bill, offers a guaranteed return, it has no risk premium, so the risk-free rate is deducted from the portfolio return. Consequently, it makes no sense to invest in the riskier assets if the return on a portfolio is equal to or lower than the risk-free rate.

As a result, the Sharpe ratio compares the portfolio's performance to the amount of risk assumed; the higher the Sharpe ratio, the better the results and the higher the profit margin for assuming more risk.

As a result, the researcher used the Sharpe index as the first metric to assess how well 30 mutual fund schemes performed.

2. Jensen’s ratio

The Jensen's measure is a risk-adjusted performance metric that shows, given the beta and average market return of the investment or portfolio, the average return

on the investment above or below that projected by the capital asset pricing model (CAPM). Another frequent name for this measure is Jensen's alpha.

$$\text{Jensen's Alpha} = \left[R_P - \left(R_f + \beta * (R_m - R_f)\right)\right]$$

Investors who wish to appropriately assess the performance of an investment manager should consider both the risk and total return of the portfolio in order to determine whether the investment's return justifies the risk taken. A logical investor would choose the less hazardous mutual fund, for instance, if both have a 12% returns. One method to assess if a portfolio is generating the right return for its degree of risk is to use Jensen's measure.

Excess returns are being earned by the portfolio if the value is positive. Stated differently, a positive Jensen's alpha number indicates that a fund management has outperformed the market through their stock selection abilities. As a result, the researcher used the Jensen measure as the second parameter to assess how well mutual fund schemes performed.

3. Treynor's Ratio

Jack Treynor developed the Treynor ratio, building on the research of William Sharpe. Treynor and Sharpe ratios are comparable; the denominator is what separates them, though.

The Treynor ratio is a measurement of the returns per unit of assumed market risk that are higher than what might have been obtained on an investment with no diversifiable risk (such as Treasury bills or a fully diversified portfolio).

$$T_R = \frac{R_p - R_f}{\beta}$$

A high Treynor ratio number indicates that an investor has made significant profits on each of the market risks he has assumed. One can comprehend the

performance of each investment in a portfolio by using the Treynor ratio. Additionally, it provides insight into the investor's level of capital usage efficiency.

Treynor index was chosen by the researcher as the third parameter as a result.

ANOVA TEST:

Analysis of Variance is referred to as ANOVA. This statistical technique examines how the means of two or more groups or treatments differ from one another. It is frequently employed to ascertain whether the means of several groups differ in any statistically meaningful ways.

ANOVA contrasts the variation within the groups with the variation between the group means. There may be a considerable difference between the group means if the variation between the group means is significantly greater than the variation within the groups.

By comparing within-group variability to between-group variability, an ANOVA yields an F-statistic. The F-statistic indicates substantial variations between group means if it is greater than a certain value.

Chapter 5 Summary and Conclusion Of Study

He study's conclusion is covered in this chapter. Each chapter's overview is provided in the opening section. Which chapter deals with what?

He has been explained. The research findings are described in the second section of the chapter, and recommendations based on the researcher's research study are provided in the last section of the chapter.

5.2 FINDINGS

- **For equity mutual fund schemes**
    - **Analysis of Sharp Ratios**: The Sharp ratio shows how much excess return an investment produces per unit of risk and is a measure of risk-adjusted return.

✓ Higher Sharp ratio schemes are thought to perform better when taking risk into account.

✓ Of the mentioned schemes, Quant Midcap Fund has the greatest Sharp ratio (1.47), indicating that its risk-adjusted returns may be superior.

✓ With Sharp ratios of 1.35 and 1.00, respectively, HDFC Mid Cap Opportunities Fund and ICICI Prudential Blue-chip Fund both exhibit excellent risk-adjusted performance.

✓ The Sharp ratio of 0.83, which indicates comparably poorer risk-adjusted returns, makes Axis Midcap Fund stand out.

- **Jensen's Alpha**: Based on a portfolio's degree of systematic risk (beta) in relation to the market, Jensen's Alpha calculates the excess return beyond predicted.

✓ Positive Jensen's Alpha values point to superior performance above the market, whereas negative ones point to worse performance.

✓ Out of all the mentioned schemes, the Quant Midcap Fund has the highest Jensen's Alpha (7.50), which indicates a notable outperformance in comparison to its projected return, which is dependent on market risk

✓ The ICICI Prudential Blue-chip Fund and the Nippon India Largecap Fund both show excellent positive alphas of 4.70 and 4.07, respectively.

✓ The Jensen's Alpha for the Axis Midcap Fund is noticeably negative at -3.40, indicating a notable underperformance in comparison to the fund's projected return given market risk.

- **Treynor's Ratio (beta):** This ratio expresses the excess return as a function of the unit of systematic risk.

✓ In comparison to the degree of systematic risk, greater performance is indicated by a larger Treynor's Ratio.

- ✓ Of the listed schemes, Quant Midcap Fund is the most notable, with the highest Treynor's Ratio of 0.26, suggesting that it may perform better than average in relation to its systematic risk.
- ✓ The Nippon India Largecap Fund and HDFC Mid Cap Opportunities Fund both have excellent Treynor's Ratios of 0.15 and 0.22, respectively.
- ✓ The Treynor's Ratio of 0.14, which indicates inferior performance in relation to systematic risk, is comparatively lower for the Axis Midcap Fund.

- **Investment Strategy Implications**:
- ✓ In order to potentially achieve greater risk-adjusted returns and outperformance in comparison to market risk, investors may want to look into schemes with higher Treynor's Ratio, higher Jensen's Alpha, and higher Sharp ratios.
- ✓ Knowledge of Jensen's Alpha and risk-adjusted performance indicators (such as Treynor's Ratio and Sharp ratio) can assist investors in selecting funds that suit their risk tolerance and investing goals.

- **For debt mutual fund schemes**
  - **Analysis of Sharpe Ratios**:
    - ✓ When risk is taken into account, the majority of the funds in the table have negative Sharpe Ratios, indicating that they offer subpar returns.
    - ✓ Some of the funds with particularly low Sharpe Ratios are the Bandhan Money Manager Fund, DSP Saving Fund, JM Low Duration Fund, Baroda BNP Paribas Low Duration Fund, and LIC MF Low Duration Fund. These funds appear to offer poor returns in comparison to the amount of risk they bear.

  - **Analysis of Jensen's Alpha**: Based on a fund's degree of risk, Jensen's Alpha calculates the excess return above expectations.
    - ✓ Positive Jensen's Alphas show that funds like the Tata Treasury Advantage Fund, the LIC MF Low Duration Fund, and INVESCO

India Money Market Fund have outperformed their expected returns given their level of Risk.

- ✓ Negative Jensen's Alphas, on the other hand, show that funds like the Franklin India Government Securities Fund and PGIM India Gilt Fund have underperformed in comparison to their expected returns.

- **Analysis of Treynor's Ratio**: Treynor's Ratio assesses the excess return per unit of systematic risk, expressed in terms of beta.
  - ✓ The majority of the funds in the table show poor returns in comparison to their systematic risk, as indicated by their negative Treynor's Ratios.
  - ✓ The Treynor's Ratio of the Franklin India Government Securities Fund is unusually low, indicating subpar return generation in comparison to systemic risk.

All things considered, the data indicates that most of the funds under consideration have had difficulty producing adequate risk-adjusted returns. On the other hand, some funds, such as the Tata Treasury Advantage Fund and the INVESCO India Money Market Fund, have performed comparatively better, exceeding their projected returns and displaying positive Sharpe Ratios and Jensen's Alphas.

On the other hand, funds like PGIM India Gilt Fund and Franklin India Government Securities Fund have underperformed in all three categories, suggesting that their investment strategy may need some tweaking. In short, although certain funds have demonstrated encouraging performance indicators, the overall picture indicates that careful assessment and possible changes to investing strategies are required to improve risk-adjusted returns and investor satisfaction.

- **For hybrid mutual fund schemes**

1. Sharp Ratio Analysis: The funds with the greatest Sharp Ratios, UTI Aggressive Hybrid Fund (1.02) and HDFC Hybrid Debt Fund (1.07), show comparatively better risk-adjusted returns when compared to other funds.

✓ The Sharp Ratio for the Navi Conservative Hybrid Fund (-0.41) is negative, indicating that the fund may have lost money in relation to the amount of risk it took.

2. Jensen Ratio Analysis: The HDFC Multi Asset Fund (5.37) has the highest Jensen Ratio, showing strong risk-adjusted returns, after taking systematic risk into account.

✓ The Jensen Ratios of the PGIM India Hybrid Equity Fund (-3.45) and the Navi Conservative Hybrid Fund (-1.68) are noticeably negative, indicating underperformance in relation to the risk-adjusted return of the market.

3. Treynor's Ratio Analysis: Based on comparatively larger Treynor's Ratios, the HDFC Hybrid Debt Fund (0.04), UTI Aggressive Hybrid Fund (0.1), and SBI Multi Asset Allocation Fund (0.1) indicate effective use of systematic risk to produce returns.

✓ The Treynor's Ratios of the PGIM India Hybrid Equity Fund (0.04) and the Navi Conservative Hybrid Fund (-0.02) are low or negative, indicating poor returns in relation to systematic risk.

4. The HDFC Multi Asset Fund is a diversified investment alternative with higher risk-adjusted returns. Its performance is stable and robust across all three ratios, highlighting the benefits of consistency and diversification.

The SBI Multi Asset Allocation Fund exhibits stable and effective systematic risk management, as seen by its steady performance in each of the three ratios.

5. Underperforming Funds: The Navi Conservative Hybrid Fund and the PGIM India Hybrid Equity Fund continuously perform worse across all three ratios, raising possible questions about their management or investment approaches.

6. Selection Points to Remember:

- ✓ Funds with outstanding performance across various measures, such as the UTI Aggressive Hybrid Fund and the HDFC Hybrid Debt Fund, may be of interest to investors looking for higher risk-adjusted returns. When choosing mutual funds to invest in, it's critical to take into account a number of criteria, including investing objectives, risk tolerance, and fund management experience.

5.3 SUGGESTIONS FOR FURTHER RESEARCH:

1. Longitudinal research:

To evaluate the performance of Indian mutual fund schemes over an extended time period that encompasses several market cycles, conduct a longitudinal research. This would offer a more thorough comprehension of their efficacy and constancy of performance over time.

2. Risk-adjusted Performance Metrics:

Examine how Indian mutual fund schemes perform by utilizing alternative risk-adjusted performance metrics such the Treynor ratio, Jensen's alpha, and Sharpe ratio. Compared to more conventional measures like the absolute return, this would offer a more sophisticated evaluation of risk-adjusted returns.

3. Factor-Based Analysis:

Examine the performance of Indian mutual fund schemes in respect to different market parameters including market risk, size, value, and momentum by using factor-based models like the Car hart four-factor model or the Fama-French three-

factor model. This would facilitate the process of studying the sources of alpha formation and determining the elements influencing performance.

4. Style Analysis:

Use a style analysis to evaluate the performance of Indian mutual fund schemes across several investment types, including growth, value, and blend. This would shed light on the investment techniques used by fund managers and how well they work to produce returns.

5. Fund Manager Analysis:

Examine how the performance of Indian mutual fund schemes is affected by fund manager attributes like tenure, experience, and expertise. This would aid in determining the characteristics linked to successful fund managers and the role that fund manager competence plays in influencing fund performance.

6. Investor Behavior:

Analyze how various aspects of investor behavior, including as fund flows, sentiment among investors, and market timing choices, affect the performance of Indian mutual fund schemes. This would shed light on how investor behavior impacts the performance of funds and what that means for fund management procedures.

7. Comparative Analysis:

In order to assess the comparative performance and competitiveness of Indian mutual fund schemes, compare their results with those of their foreign equivalents or benchmark indices. This will offer insightful information about how

competitive Indian mutual funds are worldwide and how much alpha they can produce compared to other markets.

8. Regulatory Impact:

Examine how regulatory adjustments and reforms, such as adjustments to expense ratios, transparency laws, and investment limitations, have an impact on the performance of Indian mutual fund schemes. This would make it easier to comprehend how industry practices and fund performance are shaped by regulatory dynamics.

5.4 CONCLUSIONS

In summary, the goal of this study was to assess Indian mutual fund schemes' efficacy using a thorough performance analysis. After thorough data gathering and analysis, a number of important conclusions were drawn.

First off, there are notable differences in the performance of Indian mutual fund schemes throughout various time periods and categories. Certain algorithms often beat their benchmarks, but others can't seem to produce alpha.

Second, a number of important variables influence how well mutual fund schemes work, including the expense ratio, fund size, and tenure of the fund management. Better performance is typically correlated with lower expense ratios and more seasoned fund managers.

Thirdly, the research emphasizes how crucial it is to take risk-adjusted returns into account when assessing mutual fund performance. Comparing just the raw returns could be deceptive because it might not take the fund manager's level of risk into consideration.

The importance of conducting thorough due diligence before placing an investment in mutual funds is also emphasized in the research. A number of factors should be considered by investors, such as fund strategy, risk tolerance,

and market conditions, since historical performance alone is not a reliable indicator of future returns.

To summaries, although Indian mutual fund schemes provide investors a plethora of investment options, making informed selections about investments needs meticulous deliberation and close observation. Investors who use a disciplined investing strategy and understand the factors that impact mutual fund performance can raise their chances of reaching their financial goals.

This study provides insightful information to investors, fund managers, and policymakers alike, contributing to the corpus of knowledge currently available on the evaluation of mutual fund performance in the Indian context. It is critical to acknowledge the limitations of this research, such as the restrictions on the availability of data and the inherent subjectivity of performance evaluation.

Subsequent research endeavors ought to investigate additional factors that impact mutual fund performance, the impact of regulatory modifications on fund performance, and the efficacy of diverse investment methodologies within the Indian mutual fund industry.

In summary, even with all of the obstacles and unknowns, Indian mutual fund schemes are still a good option for long-term investors who want to increase their wealth. Investors can successfully traverse the ever-changing mutual fund investing landscape and accomplish their financial goals by conducting thorough analysis and making wise decisions.

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Sample Photographs of the fieldwork / Internship

Name of Programme:- Integrated MBA

21IMBACR501_Internship -I (Internship) Social Immersion Internship at vruddhashram

21IMBACR501_Internship -I (Internship) Social Immersion Internship at vruddhashram

Name of Programme :- B. Tech. Civil Engineering

18BTCICC703_Investigation on Composite Fiber

18BTCICC703_ Investigation on Composite Fiber

Name of Programme:- B.Sc. Chemistry

21BCHCR301_Social Immersion through social work tree plantation at Gram panchayat

21BCHCR301_Social Immersion through social work at government primary school

Name of Programme: - B. Tech. Electrical Engineering

21BTEECR501_Social Immersion through social work at Shree Bolbala Charitable trust

Name of Programme:- B. Sc. Mathematics

21BMTCR401_Studying Primary Health Center

21BMTCR401_Studying Primary Health Center

Name of Programme:- B. Tech. Information Technology

21BTITCR501_Social Immersion through social work at Navjivan Trust

21BTITCR501_Social Immersion through social work at Gaushala

Name of Programme:- M.Sc. Chemistry

21MCHOCC401_Dissertation - Research project at Atmiya University, Rajkot

21MCHACC401_Intersnship at Janveda Formulation Pvt. Ltd. Ahmedabad

Name of Programme: B. Pharm.


21BPHCR601_Concept to Practice field work at Laboratory

21BPHCR601_Concept to Practice field work at Hospital/ Clinic

21BPHCR601_ Concept to Practice field work at Parking Area

21BPHCR601_ Concept to Practice field work at Apartment/ Flat

Name of Programme:- B.C.A.

21BCACR301_ Social Immersion through social work at Shri Krutarth Education Trust.

Permission letter only for internship/ project fieldwork from the competent authority

Saras

अजमेर जिला दुग्ध उत्पादक सहकारी संघ लि.,अजमेर

एच.एम.टी. के सामने, ब्यावर रोड़, अजमेर
ISO 22000:2018 Certified Organization

कमांक / प्रशासन / 2023–24 / 3851-55 दिनांक 31 / 05 / 2023

–: कार्यालय आदेश :–

Dr. Abhijeet Joshi, Coordinator, Department of Microbiology, Atmiya University,Yogidham Gurukul, Kalawad Road, Rajkot के प्राप्त पत्र AU / MB / O / ST / 17032023 / 01 दिनांक 17 / 03 / 2023 के द्वारा छात्रा Ms. Yashika Ramprakash Ojha, M.Sc. Microbiology को अजमेर डेयरी में सम्बन्धित विभाग के अधीन इनके सामने अंकित दिवसो की प्रशिक्षण की स्वीकृति प्रदान की जाती हैं :–

क्र. सं.	छात्रा का नाम	प्रशिक्षण अवधि	विभाग	प्रशिक्षण शुल्क राशि
1.	Ms. Yashika Ramprakash Ojha	01 / 06 / 23 से 30 / 06 / 23	गुण नियंत्रण	1500 / –

यह आदेश प्रबन्ध संचालक महोदय से अनुमोदित हैं।

(अतुल सक्सैना)
प्रभारी (पी.एण्ड.ए)

प्रतिलिपि सूचनार्थः–

1. निजी सहायक प्रबन्ध संचालक महोदय।
2. प्रभारी, वित्त एवं लेखा / गुण नियंत्रण।
3. Dr. Abhijeet Joshi, Coordinator, Department of Microbiology, Atmiya University,Yogidham Gurukul, Kalawad Road, Rajkot – 360005(Gujrat)
4. सम्बन्धित छात्रा Ms. Yashika Ramprakash Ojha .
5. मास्टर फाईल।
6. प्रशिक्षण पत्रावली।

(अतुल सक्सैना)
प्रभारी (पी.एण्ड.ए)

Amrut H. Dodia
B.E. Civil
M. 9374827025

MANGAL CONSULTANCY
CONSULTANT ENGINEER & CONTRACTOR
Office: 32, Mu.Shopping Centre, Deepak Chowk, Bhavnagar-1

Ref. No. Dt.

Letter of Intent

To whomsoever it may Concern

This is to certify that **Mr. VRUSHAB AMRUTBHAI DODIYA (Enrolment no.:180001004)**, student of Civil Engineering Department of **ATMIYA University, Rajkot (Deemed),** who is studying in final year (in 8th semester) is appointed/Enrolled as a trainee in our site/office at " **MANGAL CONSULTANCY " Shop No. 32, Mu. Shopping Center, Bhavnagar.** we will give our best to train him in the field with global competence. His internship duration is 01/11/2021 to 15/06/2022. This is an unpaid Internship/Training.

Mr. A.H.DODIA and other trained staff is always there for supervision at site/office and his contact details are 7016137568 (w) and E-mail ID :- amrutdodia@gmail.com.

Regards...

AMRUT H. DODIA (B.E. CIVIL)

B.M.C Engg. Lic. No.18

Structural Engg. GR1-Lic. No.38 (B.M.C.)

Structural Engg. GR1-Lic. No.11 (S.N.)

Consulting Civil Engg. Lic. No. GIDC/ATP/SEOR/131

Structural Civil Engg. Lic. No. GIDC/ATP/EOR/161

Place; Bhavnagar-364001

Date: 29/12/2021.

AMRUT H. DODIA
BE CIVIL
BMC LIC. No. 18
BADA LIC. No. 20

DR.REDDY'S
INSTITUTE OF LIFE SCIENCES

To

The Head

Biotechnology Department

Atmiya University

Respected Sir/Madam,

This is to inform you that **Ms. Muskan Bamania Rakesh** a student of the Department of Biotechnology, Atmiya University, is permitted to undertake her dissertation project at the CIMPS Department, Dr. Reddy's Institute of Life Sciences, Hyderabad, as part of the academic requirements for the M.Sc. Biotechnology program.

The student has to adhere to the rules and regulations of our institution during their tenure and maintain the highest standards of conduct and academic integrity.

Duration : 17th January - 5th April

With Regards

Deepa K M
Human Resources & Administration

Dr. Neelima Dubey
Associate Principal Research Scientist

TUV INDIA ISO 9001:2015

Hi Tech
Transpower Pvt. Ltd.
A COMPLETE ENGINEERING SOLUTION
Govt. Approved Civil & Electrical Contractor On Turnkey Basis

DATE 12/02/2024

Confirmation letter of Internship

To

Mr. DevJi Prabhubhai Chauhan

In reference to your application, we would like to congratulate on bening selected for internship with **HI-Tech Transpower Pvt.Ltd.** based at Rajkot. Your training is scheduled to start from 11/01/2024 to 10/02/2024. All of us at HI-Tech Transpower Pvt.Ltd.are excited that you will be joining our team.

As such your internship will include training orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts through hands-on application of the knowledge you learned in class.

The project details and technical platform will be shared with you on or before commencement of training .

You should report for training at the following letter address.

Yours Truly,

Hi-Tech Transpower Pvt. Ltd

Authorized Signature

Formeerly Known As Hi-Tech Profile
10 Navrangpara, Opp. Prima Product, Mavdi Plot, Rajkot - 360 004
Tel / Fax : 0281-2368376 | web : www.hitechprofile.com | E-mail : info@hitechprofile.com

Date 21/6/2023

Permission Letter

To,

Ms. Ayushi Sorathiya

Subject: Permission Granted to Undertake Internship

Dear Ayushi,

We are pleased to inform you that your request to undertake an internship with Sadbhavana Charitable Trust has been approved. We appreciate your interest in contributing to our mission and are delighted to provide you with an opportunity to learn and grow with us.

Your internship will commence on 22/6/2023. During this period, you will be involved in various activities that align with your field of interest and our organizational goals. Our team will ensure that you have a meaningful and productive learning experience.

We look forward to working with you and hope this internship proves to be both enriching and rewarding for your personal and professional growth.

Best regards,

MANAVSEVA CHERITABLE TRUST

શ્રી ગીતા ચેરીટેબલ ટ્રસ્ટ - રાજકોટ

રજી.નં. ઈ/૧૧૩૭૯/રાજકોટ

("સેવા અને સહકાર")

Date 11/6/2023

Permission Letter

To
Mr. Harshit Sojitra,

Subject: Approval for Internship at Geeta Charitable Trust

Dear Harshit,

We are delighted to inform you that your application to pursue an internship with Geeta Charitable Trust has been approved. We appreciate your interest in joining our organization and contributing to the work we do for the betterment of society.

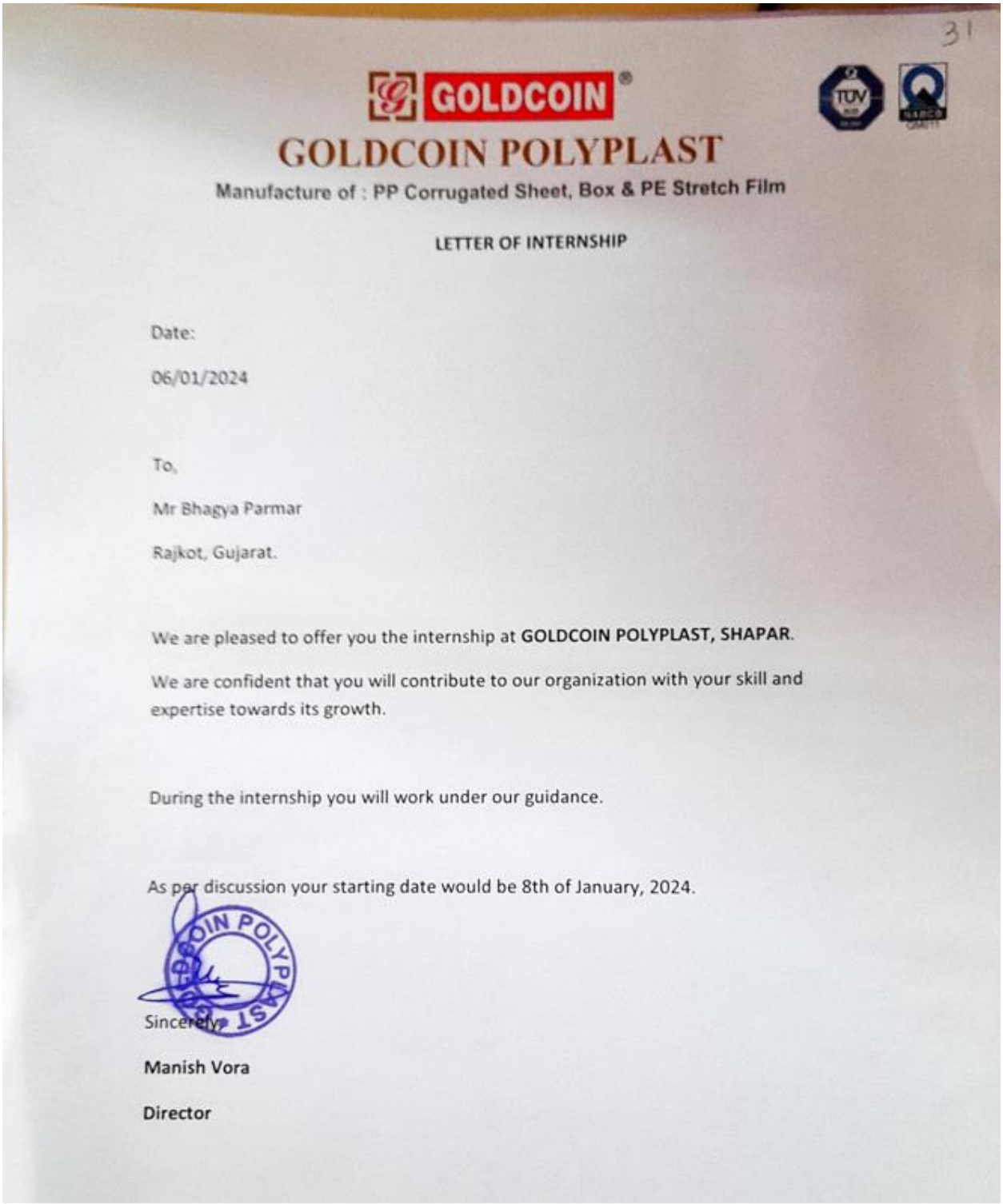
We warmly welcome you to Geeta Charitable Trust and look forward to your valuable contributions. We are confident that this internship will be a rewarding and enriching experience for you.

Best regards,

શ્રી ગીતા ચેરિટેબલ ટ્રસ્ટ – રાજકોટ
ટ્રસ્ટિ

વતી, શ્રી ગીતા ચેરીટેબલ ટ્રસ્ટ - રાજકોટ

સમભાવ કોમ્પલેક્ષ, પહેલા માળે, સત્યમ પાર્ટી પ્લોટ પાસે, SBI બેંકની બાજુમાં, નાના મૌવા મેઈન રોડ, રાજકોટ



31

GOLDCOIN®

GOLDCOIN POLYPLAST

Manufacture of : PP Corrugated Sheet, Box & PE Stretch Film

LETTER OF INTERNSHIP

Date:

06/01/2024

To,

Mr Bhagya Parmar

Rajkot, Gujarat.

We are pleased to offer you the internship at **GOLDCOIN POLYPLAST, SHAPAR**.

We are confident that you will contribute to our organization with your skill and expertise towards its growth.

During the internship you will work under our guidance.

As per discussion your starting date would be 8th of January, 2024.

GOLDCOIN POLYPLAST

Sincerely,

Manish Vora

Director

CIN No. : U31501GJ2014PLC080979

WIND | SOLAR | STORAGE | HYBRID | POWER GENERATION

onix RENEWABLE LIMITED
(Formerly known as Onix Structure Pvt. Ltd.)

Dt. 24/11/2023

Confirmation Letter of Internship

To
Mr. DHOLARIYA HARSH RAMJIBHAI

Dear Mr. Dholariya Harsh Ramjibhai, congratulations on being selected for an exciting internship opportunity with Onix Renewable Ltd. in Rajkot. Your training begins on December 1, 2023, and ends on December 30, 2023. During this program, you will work on assignments related to the new technologies adopted by GETCO, as well as future R&D projects and advancements in EHV sub-station and transmission line projects. Additional project details will be shared before the start date.

ONIX RENEWABLE LIMITED RAJKOT

BHAVESH VAGHASIYA
Authorized Person
ONIX RENEWABLE LIMITED.
RAJKOT

round pixel

51 Dealing Drive, Oakleigh South, VIC 3167
Ph. 0410 802 800 | ACN 626 610 400
riddhi@roundpixel.com.au
roundpixel.com.au

Internship Offer Letter

Dear Jay khokhara,

Following your application, we are pleased to inform you that you have been considered for an internship with Roundpixel for Looke project. As a result, you will be contributing to our project from 13 July 2023.

As a part of your internship, you will be proactively contributing to your selected project, besides product development & PoCs. In addition, you will be required to complete performance & learning goals for your current project with us.

You will be allocated project from India office from base location as below:

Roundpixel Pty Ltd
WorkEasy Coworking Space (Kalawad Road Centre) 2nd Floor 'Cross Roads, Kalawad Rd, above Jaddus Food Field Restaurant, near RPJ Hotel, Rajkot, Gujarat 360001

We hope that your association with the company will be successful and rewarding.

Regards,
Hiren Savjiyani

KOYO™ GRANITO

KOYO GRANITO LLP.
At. Rangpar,Jetpar - Pipli Road,
Morbi 363 642 Gujarat (India)

Unit 1

INTERNSHIP OFFER LETTER

Date- 01/01/2024

To,
Kaushik kaila

FROM,
KOYO GRANITO LLP
Rangpar
morbi-363641

Mr. Kaushik Kaila

This is in response to your application for internship with KOYO GRENITO LLP. We would like to extent heartiest congratulations on your selection for internship with KOYO GRENITO LLP. based at MORBI for a duration of three months. Your internship will start from January 1st, 2024 and will complete on March 31st, 2024. Our team at KOYO GRANITO LLP is looking forward to have you work with us. During your internship, the concentration will be on helping you understand the theoretical concepts with their practicality and implications to help you connect your classroom knowledge and on-field experience. We will be happy to train you to learn new skills which are extremely helpful in the professional setting.

Internship Details:
Position: Intern
Department:Export Marketing department
Start Date: 01/01/2024
End Date: 31/01/2024
Working Hours: 6 hours per day
Compensation: Unpaid

Regards,

Harsh Bhai
(Export Marketing Manager)
KOYO GRANITO LLP
KOYO GRANITO LLP
DESIGNATED PARTNER