

DEVELOPMENT OF ORGANIC COSMETIC BODY OIL FROM NATURAL COMPOUND USING *FICUS CARICA*

PROJECT WORK

Submitted in partial fulfillment of the requirements for the award of Bachelor
of Science Degree in Biotechnology

By

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SCHOOL OF BIO AND CHEMICAL ENGINEERING

DEPARTMENT OF BIOTECHNOLOGY

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY (DEEMED TO BE
UNIVERSITY) CATEGORY- 1 UNIVERSITY BY UGC**

Accredited with GRADE “A++” by NAAC | 12B Status by UGC | Approved by AICTE

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **NITHIN SINGH K(41770017)/ RAGHUL RAJ D(41770022)** who have done the project work as a team "**DEVELOPMENT OF ORGANIC COSMETIC BODY OIL FROM NATURAL COMPOUND USING *FICUS CARICA***" under my supervision from January 2024 to April 2024.

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I, **NITHIN SINGH K (41770017)** and **RAGHUL RAJ D (41770022)** hereby declare that the Project Report entitled “**DEVELOPMENT OF ORGANIC COSMETIC BODY OIL FROM NATURAL COMPOUND USING *FICUS CARICA*** ” was done by me under the internal guidance of Dr.S . Jayashree as Department of Biotechnolohy at Sathyabama Institute of Science and Technology, Chennai, TamilNadu, India, is submitted in partial fulfillment of the requirements for the award of Bachelor of Biotechnology.

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ABSTRACT

This study presents a novel approach to the extraction of organic compounds from fig, onion, pomegranate, and grape seed using sesame oil. The extraction process involves the use of 4ml of fig extract as the major component, with the addition of 2ml of other extracts. The resulting mixture undergoes a series of rigorous tests to confirm its organic purity. These tests include Gas Chromatography-Mass Spectrometry (GCMS) for compound identification, antioxidant tests for determining free radical scavenging activity, antibacterial tests for assessing antimicrobial properties, irritation tests for skin compatibility, stability tests for shelf-life determination, and viscosity tests for texture and consistency evaluation. The results confirm that the oil produced through this method is pure and organic, offering potential applications in various industries such as cosmetics, pharmaceuticals, and food. This research contributes to the growing body of knowledge in organic extraction methods and paves the way for future studies on the benefits and applications of these organic oils.

TABLE OF CONTENTS

Chapter		PAGE
No	TITLE	NO
CONTENTS		li
	LIST OF FIGURES	V
		LIST OF TABLES
		vi
1	INTRODUCTION	1
	1.1 Importance of body oil	1
	1.2 Types of Body Oil	1
	1.3 Needs for Organic Body Oil	2
	1.4 Need for Organic Body Oil Especially for	
	Kids	2
	1.5 Advantages of Using Body Oil	3
	1.6 Existing and Commercial Body Oil	4
2	LITERATURE SURVEY	5
3	AIM AND SCOPE	10
4	MATERIALS AND METHODOLOGY	11
	4.1 Fruit material	13
	4.1.1 <i>figus carica</i>	13
	4.2 Seeds	14
	4.2.1 <i>allium cepa</i>	14
	4.2.2 <i>vitis vinifera</i>	15
	4.2.3 <i>punica garantum</i>	16
	4.3 <i>Sesamum indicum</i>	17
	4.4 Methodology	18
	4.4.1 Extraction of fig extract base	18
	4.4.2 Preparation of onion seed and extract	

base	18
4.4.3 Preparation of pomegranate seed	
extract	19
4.4.4 Preparation of grapeseed extract base	19
4.5 Final preparation of body oil	20
4.5.1 Mixture of properties	20
4.6 Final oil formulation	21
5 RESULTS AND DISCUSSION	23
5.1 Evaluation	23
5.1.1 Colour and appearance	23
5.1.2 Ph	23
5.1.3 Irritancy test	23
5.1.4 Rheological study- determination of	
viscosity	23
5.1.5 Stability testing	24
5.1.6 Gcms – gass chromatography/ mass	
spectrometry	24
5.1.7 Anti- microbial assay	24
5.1.8 Dpph assay	25
5.2 Results	25
5.2.1 Extraction of FICUS Carica	25
5.2.2 Extraction of Onion Seed oil	25
5.2.3 Extraction of Pomegranate oil	26
5.2.4 Extraction of Grape Seed Oil	26
5.2.5 Colour and Appearance	26
5.2.6 PH of Body oil	27
5.2.7 Irritancy Test	27
5.2.8 Rheological Study – Determination of	

5.2.9 Stability test 28

5.2.10 GCMS 28

5.2.11 Anti-Microbial acid 30

5.2.12 DPPA Assay 31

5.2.13 Statistical Analysis 35

6 SUMMARY AND CONCLUSION 39

REFERENCE

LIST OF FIGURES	FIGURE NO	FIGURE NAME	PAGE NO
4.1		<i>Ficus carica</i>	14
4.2		<i>Allium cepa</i>	15
4.3		<i>Vitis vinifera</i>	16
4.4		<i>Punica granatum</i>	17
4.5		Final formulation	22
5.1		Extraction of <i>Ficus carica</i>	25
5.2		Extraction of Onion Seed Oil	25
5.3		Extraction of Pomegranate Seed Oil	26
5.4		Extraction of Grape Seed oil	26
5.5		PH Meter	27
5.6		GCMS	29
5.7		Anti-microbial assay	31
5.8		Sample 1	33
5.9		Sample 2	34
5.10		Sample 3	35

5.11	One-way Anova on the DPPH Absorbance	36
5.12	One-way Anova	37

LIST OF TABLES

S. No	TABLES	PAGE NO
4.1	FORMULATION 1	21
4.2	FORMULATION 2	21
4.3	FORMULATION 3	22
5.1	Analysis of colour and appearance	26
5.2	Irritancy Test	27
5.3	Determination of viscosity	28
5.4	stability testing in body oil	28
5.5	Peak Report TIC	29
5.6	Anti-Microbial Assay	30
5.7	DPPH Assay	31
5.8	DPPH Assay sample -1	32
5.9	DPPH Assay sample -2	33
5.10	DPPH Assay sample -3	34

CHAPTER1 INTRODUCTION

1.1IMPORTANCE OF BODY OIL

Body oil serves as a crucial component in skincare routines, offering multifaceted benefits that contribute to the health and appearance of the skin. Primarily, it acts as a potent moisturizer, deeply hydrating the skin and preventing dryness. By forming a protective barrier, body oil helps lock in moisture, ensuring that the skin remains supple and smooth. Moreover, body oils are rich in essential nutrients, including vitamins and antioxidants, which nourish the skin and promote its overall well-being.

One of the key advantages of body oil is its ability to combat signs of aging. The antioxidants present in many oils help neutralize free radicals, reducing oxidative stress and preventing premature aging. Regular use of body oil can thus result in firmer, more youthful-looking skin. Additionally, body oil can be utilized for massage, providing relaxation and relief from tension and stress. The soothing properties of certain oils can also promote better sleep and alleviate anxiety.

In essence, incorporating body oil into one's skincare routine can yield transformative results, from improving skin texture and appearance to promoting relaxation and well-being. Its versatility and efficacy make it a valuable addition to any self-care regimen, offering a holistic approach to nourishing and pampering the skin..

1.2 TYPES OF BODY OIL.

Various types of body oils cater to different skin types and preferences, each offering unique benefits and properties. Coconut oil is renowned for its moisturizing capabilities and antimicrobial properties, making it suitable for dry and sensitive skin. Argan oil, extracted from the kernels of the argan tree,

1

is rich in antioxidants and fatty acids, ideal for nourishing and revitalizing the skin. Jojoba oil closely resembles the skin's natural oils, making it suitable for all skin types, especially those prone to acne or sensitivity. Sweet almond oil is lightweight and easily absorbed, perfect for hydrating and soothing the skin without clogging pores. Grapeseed oil is high in linoleic acid, making it beneficial for oily and acne-prone skin, as it helps regulate sebum production. These are just a few examples of the diverse range of body oils available, each offering unique properties to address various skincare needs and preferences..

1.3 NEEDS FOR ORGANIC BODY OIL

The demand for organic body oil arises from a growing awareness of the potential risks associated with synthetic chemicals and additives commonly found in conventional skincare products. Organic body oils, derived from natural and sustainably sourced ingredients, offer a safer and more environmentally friendly alternative. By avoiding pesticides, synthetic fertilizers, and genetically modified organisms (GMOs), organic body oils minimize exposure to potentially harmful substances, reducing the risk of skin irritation, allergic reactions, and long-term health effects.

Moreover, organic farming practices prioritize soil health, biodiversity, and conservation, contributing to a healthier planet and supporting sustainable agricultural communities. Choosing organic body oil also aligns with ethical considerations, as it often involves fair trade practices and supports smallscale farmers and producers. Additionally, organic body oils typically contain higher concentrations of vitamins, antioxidants, and essential fatty acids, providing superior nourishment and hydration for the skin without compromising on efficacy or safety. Overall, the need for organic body oil reflects a broader shift

towards more conscious and sustainable consumption habits in the realm of
skincare

1.4 NEED FOR ORGANIC BODY OIL, ESPECIALLY FOR KIDS

Organic body oil for kids addresses the specific needs and concerns of young and delicate skin. Children's skin is more susceptible to irritation and sensitivity due to its thinner and more porous nature, making it crucial to use gentle and natural products. Organic body oils are free from harsh chemicals, synthetic fragrances, and artificial additives, minimizing the risk of allergic reactions and skin irritation in children.

Furthermore, organic body oils often contain nourishing ingredients such as plant-based oils and botanical extracts, providing essential hydration and nutrients to support the skin's health and development. These natural ingredients are safer for kids' skin and less likely to cause adverse effects compared to their synthetic counterparts. Additionally, organic farming practices prioritize environmental sustainability, ensuring that children are exposed to fewer harmful substances in their skincare products while also promoting a healthier planet for future generations. Overall, the need for organic body oil for kids reflects a commitment to providing safe, gentle, and effective skincare solutions tailored to children's unique needs.

1.5 THE ADVANTAGES OF USING BODY OIL.

Using body oil offers a range of advantages for skincare and overall wellbeing. Firstly, body oil effectively moisturizes the skin, helping to prevent dryness and maintain hydration levels. It forms a protective barrier on the skin's surface, sealing in moisture and preventing water loss throughout the day. Moreover, body oils often contain nourishing ingredients such as vitamins, antioxidants, and essential fatty acids, which provide additional benefits for the skin. These ingredients help to replenish and rejuvenate the skin, promoting a healthier and more radiant complexion. Additionally, the act of massaging body oil into the skin can be therapeutic, promoting relaxation and reducing stress. It can also help improve circulation and lymphatic drainage, leading to smoother, firmer, and more toned skin over time. Overall, incorporating body oil into a

skincare routine can result in softer, smoother, and more hydrated skin, while also providing an opportunity for self-care and relaxation.

1.6 EXISTING AND COMMERCIAL BODY OIL

Existing commercial body oils encompass a wide array of options catering to diverse skincare needs and preferences. Renowned brands offer a plethora of formulations ranging from lightweight and fast-absorbing oils to luxurious blends infused with botanical extracts and essential oils. These body oils often boast various benefits such as deep hydration, nourishment, and skin rejuvenation, targeting specific concerns like dryness, aging, or sensitivity. Commercial body oils frequently feature key ingredients such as coconut oil, argan oil, jojoba oil, and almond oil, known for their moisturizing and skin-nourishing properties. Additionally, many commercial body oils are enriched with vitamins, antioxidants, and natural botanical extracts to enhance their efficacy and promote overall skin health. Available in different scents and textures, commercial body oils offer a sensory experience that appeals to various preferences, whether seeking a refreshing citrus aroma or a calming lavender fragrance. With their convenience and effectiveness, these commercial body oils provide accessible solutions for maintaining soft, supple, and radiant skin.

CHAPTER 2

LITERATURE SURVEY

Alcicek *et al.*,2004 States that the impact of dietary supplementation with an essential oil mixture (EOM), an organic acid, and a probiotic on the growth performance and carcass yield of broilers. The study involved 1,250 sexed one-day-old broiler chicks allocated randomly into five treatment groups, each with 250 birds, and further subdivided into five replicates per group. The EOM, derived from various herbs in Turkey, was administered at two levels alongside the organic acid and probiotic. Results indicate significant effects of dietary treatments on body weight gain, feed intake, carcass yield, and intestinal weight at 42 days of age. Specifically, chicks fed with 36 mg EOM/kg exhibited the highest body weight gain, followed by those on 48 mg EOM/kg, probiotic, organic acid, and negative control diets. Additionally, the EOM supplementation notably improved the feed conversion ratio compared to the negative control and organic acid treatments. Furthermore, differences in feed intake were observed at days 21 and 42 among the treatments. The addition of 48 mg EOM/kg led to a significant increase in carcass yield, while both EOM and organic acid reduced intestinal weight significantly. In conclusion, incorporating the herbal essential oil mixture into broiler diets demonstrated favorable effects on body weight gain, feed conversion ratio, and carcass yield.

Helen *et.al.*,2000 States that the antioxidant properties of onion oil in nicotineadministered rats, comparing its effectiveness to vitamin E, a potent antioxidant. The study assesses the ability of onion oil to counter peroxidative damage induced by nicotine in the liver, lungs, and heart, analyzing lipid peroxidation products and antioxidant defense systems. Rats were injected with nicotine and simultaneously supplemented with onion oil or vitamin E for 21 days. Nicotine-treated rats exhibited significantly increased levels of lipid peroxidation products compared to normal rats, while onion oil supplementation showed increased resistance to lipid peroxidation, akin to vitamin E. Nicotine treatment decreased the activity of catalase and superoxide dismutase, with no significant difference in antioxidants such as glutathione, vitamin C, and retinol, but a notable decrease in

liver vitamin E content. However, supplementation with onion oil or vitamin E significantly elevated antioxidant concentrations in all tissues, particularly in rats treated with vitamin E alongside nicotine, indicating the effectiveness of onion oil as an antioxidant against nicotine-induced oxidative damage, comparable to vitamin E.

Sampath Kumar *et.al.*, 2010 States that the myriad health benefits of onions, attributed to their rich phytoncid content, which possesses antimicrobial properties effective against various pathogenic microbes, making onions a common remedy for catarrhal diseases including flu, angina, lung inflammation, and cough. Additionally, onions are utilized in the treatment of bronchial asthma and are believed to prevent prostatic hypertrophy, with historical references in ancient Egypt even suggesting aphrodisiac qualities. Furthermore, onions are noted for their ability to prevent atherosclerosis and cardiovascular diseases by reducing blood coagulation and atherosclerotic plaque formation, with a single onion bulb purported to have effects comparable to cardio aspirin. Moreover, onions are beneficial for kidney function, nitrogen absorption from blood, and possess anticarcinogenic properties. They also aid digestion, regulate bowel function, and exhibit antimicrobial activity. Notably, the medicinal properties of onions surpass those of many drugs, often without the associated side effects, and various parts of the plant find applications in traditional medicines, such as onion seeds for dental worms and urinary diseases, and onion stalks as a source of essential vitamins and minerals including Vitamin A, thiamin, and ascorbic acid, suitable for both tender and mature stages of use.

Sunil Pareek *et.al* 2017 States that the nutritional richness of onions, emphasizing their abundance in dietary flavonoids and the presence of three essential phytochemicals—flavonoids, fructans, and organosulfur compounds—in optimal balance. These phytochemicals hold significant potential in promoting human health and safeguarding against various ailments, including cancer. In addition to sulfur and flavonoid constituents, onions contain a plethora of other beneficial compounds, such as lectins, prostaglandins, fructan, pectin, adenosine, and a range of essential vitamins including B1, B2, B6, C, and E, as well as biotin, nicotinic acid, fatty acids, glycolipids, phospholipids, and essential amino acids, extensively studied for their

biological effects over many years. Epidemiological studies have highlighted onions' antiplatelet activity, attributed largely to their organosulfur compounds. Notably, a specific class of α -sulfinyl-disulfides (cepaenes) found in onion extracts has exhibited antithrombotic properties, shedding light on the multifaceted health benefits of onions.

JoaheerD.Teshika *et.al.*, 2018 States that the multifaceted role of onion (*Allium cepa* L.), a widely consumed and cultivated vegetable globally, renowned for its distinctive flavor and ranking as the third most crucial horticultural spice with considerable commercial importance. Beyond its culinary significance, *A. cepa* holds traditional medicinal value across various indigenous cultures, prompting numerous publications to explore and validate such claims. However, there remains a scarcity of comprehensive, updated compilations and critical analyses regarding the traditional and ethnopharmacological properties of *A. cepa*. This review thus systematically examines the published literature on the traditional uses, pharmacological attributes, and phytochemical composition of *A. cepa*, revealing a diverse array of bioactive compounds and pharmacological effects. These include antimicrobial, antioxidant, analgesic, anti-inflammatory, antidiabetic, hypolipidemic, anti-hypertensive, and immunoprotected properties. Despite an abundance of in vitro and in vivo studies, several research gaps and limitations persist, underscoring the need for further investigation in future studies.

Marta Sharafan *et.al.*, 2023 states that the multifaceted applications of *Vitisvinifera*, one of the most popular fruit crops globally, cultivated extensively across continents like Europe, the Middle East, and Asia. Renowned for its historical medicinal uses against ailments such as cancer, eye infections, sore throat, and nausea, *V. vinifera* is currently spotlighted for its sustainable development potential, particularly in utilizing its waste matter rich in bioactive compounds like phenolic compounds, flavonoids, stilbenoids, and anthocyanins. Despite its absence in pharmacopeias, *V. vinifera* garners positive opinions from esteemed organizations like EMA, FDA, and EFSA. In the food industry, *V. vinifera* finds application in wine, juice, and raisin production, while its phytochemical composition underscores its antioxidant, antibacterial, anti-inflammatory, and various protective properties crucial for

pharmaceuticals and cosmetics. *V. vinifera*'s derivatives are highly valued in cosmetics for their anti-aging, skinwhitening, and UV-protection attributes, with extensive use in southern and central Europe, the United States, China, and South Korea. Additionally, *V. vinifera* is a subject of biotechnological interest, especially in in vitro stem cell and tissue culture studies, suggesting potential innovative cosmetic ingredients in the future.

RamziShawahna *et.al.*, 2023 States that the promising cosmetic potential of a novel grapeseed oil-loaded dermocosmeticonanoemulgel, suggesting its utility in enhancing skin imperfections. However, further research is warranted to comprehensively assess the benefits of this formulation in various disease conditions, underscoring the need for future studies to explore its therapeutic efficacy beyond cosmetic applications.

ElaheMaghsoudlou *et.al.*, 2016 States that the antioxidant activity of pulp (P) and skin (S) extracts from two fig varieties (Sabz(G) and Siyah(B)) using subcritical water extraction. Evaluation through 2,2'-diphenyl-1-picryl hydrazyl radical, reducing power, and rancimat tests reveals higher levels of polyphenols and flavonoids in the Siyah variety compared to Sabz. Siyah exhibits superior phenolic compound and flavonoid levels overall, with its skin extract demonstrating the lowest IC₅₀ in DPPH and reducing power tests, while no significant difference is observed in rancimat tests between the fig extracts. Assessing oxidative stability in canola oil against synthetic antioxidants like tert-Butylhydroquinone (TBHQ) indicates the superior antioxidant activity of Siyah skin extract, comparable to TBHQ. This suggests the potential of Siyah fig skin as a rich source of phenolic compounds with significant antioxidant properties.

Nina Djapic *et.al.*, 2023 States that a detailed examination of the constituents found within the essential oil and supercritical carbon dioxide (SC CO₂) extracts of *Vitisvinifera* leaves, elucidating their role in shaping the distinctive flavor and aroma characteristics of the plant. Through rigorous analysis of existing research, this survey highlights the key compounds identified in these extracts, providing valuable insights into their chemical composition and sensory attributes. By synthesizing

findings from diverse sources, it contributes to a deeper understanding of the complex interplay between phytochemical constituents and sensory perception in *V. vinifera* leaves, thus enriching the broader discourse on flavor science and natural product chemistry.

Mehdi Jahani *et.al.*,2020 States that a comprehensive analysis of the potential use of anise essential oil as a biofungicide against phytopathogenic fungi, particularly *Penicillium* sp., on grapefruit. Through an investigation of its effects on mycelial growth reduction in vitro and decreased disease symptoms on grapefruit, the survey indicates promising applications of anise essential oil as an alternative to synthetic fungicides. Moreover, insights into its influence on gene expression patterns related to glycolysis and energy metabolism in fungal pathogens underscore its potential to disrupt normal physiological activities, leading to the breakdown of fungal balance. Notably, the oil demonstrates both high efficacy and low toxicity, suggesting its viability as an eco-friendly pesticide for agricultural purposes. Despite these encouraging findings, further research is deemed necessary to fully ascertain the commercial and natural antifungal properties of anise essential oil, particularly in extending the postharvest storage life of various horticultural crops.

CHAPTER-3

AIM AND OBJECTIVES

3. 1.AIM

To develop organic cosmetic body oil from natural compounds using *ficuscarica*

3.2. OBJECTIVES

- Formulation of organic body cosmetic body oil
- Testing for antioxidant properties

- Assessment of physical properties
 - Skin irritation test
 - Antibacterial activity and gcms analysis
- MATERIALS AND METHODOLOGY**

4.1 FRUIT MATERIAL

- *Ficuscarica* (fig)
- *Allium cepa* (onion seed)
- *Vitisvinifera* (grape seed)
- *Punicagranatum* (pomegranate)
- *Sesamumindicum* (sesame oil)

4.1.1 *Ficuscarica*

Ficuscarica, commonly known as the fig tree offers a range of benefits for skin health and vitality. Rich in vitamins, minerals, and antioxidants, this versatile plant extract has been utilized in skincare for centuries. One of the key benefits of *ficuscarica* for the skin is its moisturizing properties. The natural sugars and mucilage present in figs help to hydrate the skin, keeping it soft and supple. Additionally, fig extract contains potent antioxidants such as vitamins A and E, which protect the skin from environmental damage and oxidative stress. These antioxidants also help to combat signs of aging by reducing the appearance of fine lines, wrinkles, and age spots. Furthermore, *ficuscarica* extract possesses antiinflammatory properties, making it beneficial for soothing irritated or inflamed skin conditions such as eczema or psoriasis. It can also help to promote healing and repair damaged skin cells. Moreover, fig extract contains enzymes that gently exfoliate the skin, promoting cell turnover and revealing a brighter, more radiant complexion. Its natural astringent properties help to tighten pores and improve skin texture, making it particularly beneficial for oily or acne-prone skin.

.Overall, *ficuscarica* offers a holistic approach to skincare, providing hydration, antioxidant protection, anti-inflammatory benefits, and gentle exfoliation for healthier, more youthful-looking skin



Fig 4.1 *ficuscarica*

4.2 SEEDS

4.2.1 *allium cepa* .

Onion seeds, also known as onion seed extract or *Nigella sativa* seed extract, offer several benefits for the skin: **Antioxidant Properties.** Onion seeds are rich in antioxidants like thymoquinone, which help protect the skin from damage caused by free radicals, thus reducing signs of aging. **Antiinflammatory Effects** Compounds in onion seeds have anti-inflammatory properties, which can soothe irritated skin, reduce redness, and alleviate conditions like eczema and psoriasis. **Antibacterial and Antifungal:** Onion seeds contain antimicrobial properties that can help combat bacteria and fungi, making them beneficial for treating acne and other skin infections. **Skin Brightening:** Regular use of onion seed extract can help lighten dark spots and hyperpigmentation, promoting a more even skin tone. **Moisturizing:** The oil extracted from onion seeds can moisturize the skin, keeping it hydrated and preventing dryness. **Wound Healing:** Onion seeds have been traditionally used for wound healing due to their antibacterial properties and ability to promote tissue regeneration. While not directly related to skin, onion seed oil is also beneficial for hair health, promoting growth, and preventing dandruff and scalp infections, which indirectly contribute to overall skin health. It's essential to perform a patch test

before using onion seed extract on the skin, especially for those with sensitive skin, to ensure there are no adverse reactions.



fig 4.2 allium cepa

4.2.2 Vitisvinifera

Vitisvinifera, commonly known as grape seed extract, offers a myriad of benefits for skin health and beauty. Rich in antioxidants such as proanthocyanidins, resveratrol, and vitamins C and E, grape seed extract helps protect the skin from environmental damage, including UV radiation and pollution. These antioxidants also promote collagen production, improving skin elasticity and reducing the appearance of wrinkles and fine lines. Additionally, grape seed extract possesses anti-inflammatory properties, making it beneficial for soothing irritated or inflamed skin conditions like eczema and dermatitis. The lightweight texture of grape seed extract allows it to be easily absorbed into the skin, providing intense hydration without clogging pores, making it suitable for all skin types, including oily and acneprone skin. Regular use of grape seed extract in skincare products can help nourish, rejuvenate, and maintain the overall health and appearance of the skin.



Fig 4.3 vitisvinifera

4.2.3 *Punicagranatum*

Punicagranatum, commonly known as pomegranate, offers an array of benefits for skin health and beauty. Rich in antioxidants like vitamin C, ellagic acid, and anthocyanins, pomegranate extract helps protect the skin from free radical damage caused by UV radiation and environmental pollutants. These antioxidants also promote collagen production, improving skin elasticity and reducing the appearance of wrinkles and fine lines. Moreover, pomegranate extract possesses anti-inflammatory properties, making it effective in soothing irritated or inflamed skin conditions such as acne, eczema, and psoriasis. It also contains antimicrobial properties that help fight against acne-causing bacteria, keeping the skin clear and blemish-free. Furthermore, the high concentration of polyphenols in pomegranate extract contributes to its ability to brighten the skin and even out skin tone reducing the appearance of dark spots and hyper pigmentation. Additionally, pomegranate extract is hydrating and nourishing for the skin, helping to maintain its moisture barrier and leaving it feeling soft, smooth, and supple. Overall, incorporating pomegranate extract into skincare routines can help rejuvenate, protect, and enhance the overall health and appearance of the skin, making it a valuable ingredient in various skincare products.



fig 4.4 Punicagranatum

4.3 SESAMUM INDICUM

Sesamum indicum, commonly known as sesame seed oil, offers a plethora of benefits for skin health and beauty. Rich in vitamins, minerals, and antioxidants, sesame seed oil provides nourishment and protection to the skin. One of the key benefits of sesame seed oil for the skin is its moisturizing properties. It contains fatty acids, such as linoleic acid and oleic acid, which help to hydrate and soften the skin, making it an excellent choice for individuals with dry or dehydrated skin. Moreover, sesame seed oil is rich in antioxidants like vitamin E, which helps protect the skin from free radical damage and premature aging. These antioxidants also promote skin regeneration, reducing the appearance of wrinkles and fine lines. Additionally, sesame seed oil has anti-inflammatory properties, making it beneficial for soothing and calming irritated or inflamed skin conditions such as eczema and psoriasis. It also possesses antibacterial properties that help us to fight against acne-causing bacteria, keeping the skin clear and blemish-free. Furthermore, sesame seed oil is lightweight and easily absorbed into the skin, leaving it feeling soft, smooth, and supple without clogging pores. Overall, sesame seed oil is a versatile and beneficial ingredient in skincare, offering hydration, protection, and nourishment for healthy and radiant-looking skin.

4.4 METHODOLOGY

4.4.1 Extraction Of Fig Extract Base

- Start with 1kg of fresh figs.
- The figs are thoroughly washed to remove any dirt or impurities
- They are then cut into small pieces to increase the surface area for extraction
- The cutted figs are ground using a grinder
- The ground figs are then added to sesame oil
- The mixture of ground figs and sesame oil is heated on a stove for about 15 minutes
- The heat facilitates the infusion of the fig extract into the sesame oil
- It's important to stir the mixture continuously during this period to prevent it from burning
- After heating the mixture is allowed to cool down
- Once its cool its time to separate the oil from the solid residues
- This is done by straining the mixture through a cotton cloth
- The oil collected after this process is pure fig oil, ready for further testing and use

4.2.2 Preparation Of Onion Seed N Extract Base

- Begin with 100g of onion seeds
- The onion seeds are added to 200 ml of sesame
- The mixture of onion seeds and sesame oil is heated on a stove for about 15 minutes
- The heat facilitates the extraction of oil from the onion seeds into the sesame oil
- Its important to stir the mixture continuously during this period to ensure even heat distribution and prevent any burning
- After heating the mixture is allowed to cool down
- Once its cool its time to separate the oil from the solid residues

- This is done by straining the mixture through a cotton cloth
- The oil collected after this process is pure onion seed oil ready for further testing and use

4.4.3 Preparation Of Pomegranate Seed Extract Base

- Begin with 100g of pomegranate seeds
- The pomegranate seeds are added to 200 ml of sesame
- The mixture of pomegranate seeds and sesame oil is heated on a stove for about 15 minutes
- The heat facilitates the extraction of oil from the pomegranate seeds into the sesame oil
- Its important to stir the mixture continuously during this period to ensure even heat distribution and prevent any burning
- After heating the mixture is allowed to cool down
- Once its cool its time to separate the oil from the solid residues
- This is done by straining the mixture through a cotton cloth
- The oil collected after this process is pure pomegranate seed oil ready for further testing an

4.4.4 Preparation Of Grapeseed Extract Base

- Begin with 100g of grape seeds
- The grape seeds are added to 200 ml of sesame
- The mixture of grape seeds and sesame oil is heated on a stove for about 15 minutes
- The heat facilitates the extraction of oil from the grape seeds into the sesame oil

- Its important to stir the mixture continuously during this period to ensure even heat distribution and prevent any burning
- After heating the mixture is allowed to cool down
- Once its cool its time to separate the oil from the solid residues
- This is done by straining the mixture through a cotton cloth
- The oil collected after this process is pure grape seed oil ready for further testing and use

4.5 FINAL PREPARATION OF BODY OIL

4.5.1 Mixture Of Proportions

- After the individual extraction of pomegranate, onion, and grape oils from their respective seeds these oils are mixed in specific ratios to ensure the quality and efficacy of the final product
- The fig oil which is extracted from the FicusCarica plant serves as the base for this blend
- A quantity of 4ml of fig oil is taken as the starting point
- Next the pomegranate, grape, and onion oils are added
- Each of these oils is added in a quantity of 2ml to the fig oil
- The blending process is crucial to achieving a balanced and effective 0
- The oils are mixed thoroughly to ensure a uniform distribution of all the components
- This meticulous blending process results in a body oil with a pleasant aroma, indicating the successful combination of the oils

4.6 FINAL OIL FORMULATION

Table 4.1 formulation - 1

INGREDIENTS	QUANTITY
Fig	4ML
Onion seed oil	2 ML
Grape seed oil	2 ML
Pomegranate seed oil	2 ML

Table 4.2 formulation- 2

INGREDIENTS	QUANTITY
Fig	4ML
Onion seed oil	3 ML
Grape seed oil	1 ML
Pomegranate seed oil	2 ML

Table 4.3 formulation- 3

INGREDIENTS	QUANTITY
FIG	4ML
ONION SEED OIL	2ML
GRAPE SEED OIL	3ML

POMEGRANATE SEED OIL	1 ML
----------------------	------



Fig 4.5 final formulation

CHAPTER 5 RESULT AND DISCUSSION

5.1 EVALUATION

5.1.1 Colour and Appearance

The Colour and appearance of the formulation was observed visually. The formulation procedure uniform distribution of extracts. This test was confirmed by visual appearance and by touch the sample.

5.1.2 Ph

The oil formulation designed for topical use should ideally match the pH of the skin, which falls within an acidic range. Therefore, the pH of skin oil should typically range from 5 to 9 to maintain their effectiveness over time. It's crucial for skin oil to exhibit chemical inertness, ensuring neither excessive acidity nor alkalinity, to preserve their shelf life. Consequently, it is inferred that the optimal pH of skin lies within the range of 4 to 5.5. (Arunachalam *et al.*, 2022)

5.1.3 IRRITANCY TEST

The prepared oil was applied to the previously marked area of a 1 square cm was Marked on the left-hand dorsal surface and time was recorded. Skin was then observed For irritancy, erythema and edema (if any), for regular intervals up to 24 hrs

5.1.4 Rheological Study - Determination of Viscosity

Viscosity is a critical parameter for topical formulation. Topical solutions with low viscosity have faster clearance than viscous solutions. In addition, highly viscous solutions can have an undesirable effect on the skin. Viscosity is determined by Ostwald Viscometer, when a layer of liquid is subjected to move upon a surface or another layer of the serum liquid, the fluid particles tend to oppose such Movement , this resisting force developed by a liquid is called viscosity.

5.1.5 Stability Testing

In organic body oil the proper formulation and preparation of any pharmaceutical or cosmetic product require thorough stability studies to assess its physical and chemical stability. This ensures product safety under accelerated conditions, as per ICH guidelines, where elevated temperatures and moisture are applied. A brief three-month accelerated stability study was conducted for the prepared formulation, storing samples at temperatures of 35°C, 25°C with 60% relative humidity, and 40°C with $\pm 2\%$ relative humidity.

Samples were withdrawn monthly and analysed for various parameters.

5.1.6 GCMS-Gass Chromatography / Mass Spectrometry

Gas Chromatography-Mass Spectrometry (GC-MS) is a powerful analytical technique that combines the separation capabilities of gas chromatography with the detection and identification capabilities of mass spectrometry. It is widely used in various fields such as 46 chemistry, biochemistry, environmental science, pharmaceuticals, forensics, food and skin care analysis. Gas Chromatography-Mass Spectrometry (GC-MS) can be employed in various aspects of the production and quality control of facial serums in the cosmetics industry.

5.1.7 Anti-Microbial Assay

Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants or microbial extracts. To perform the assay, we used a gram-negative bacteria 47 *Escherichia coli* in this method the agar plate surface is inoculated by spreading a volume of the microbial inoculum over the entire agar surface. Then, a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip, and a volume (20–100 μ L) of the antimicrobial agent or extract solution at desired concentration is introduced into the well. Then, agar plates are incubated under suitable conditions depending upon the test microorganism. The antimicrobial agent diffuses in the agar medium and inhibits the growth of the microbial strain tested.

5.1.8 DPPH Assay

0.1mM DPPH solution was prepared by dissolving 4mg of DPPH in 100ml of ethanol. Different volumes (3- 48 μ l) of extracts were made up to 50 μ l with DMSO and 2.96ml DPPH (0.1mM) solution was added. The reaction mixture was incubated in dark condition at room temperature for 20 min

5.2 RESULT AND DISCUSSION

5.2.1. Extraction of ficus carica oil



Fig.5.1. Extraction of ficus carica

5.2.2. Extraction of onion seed oil



Fig5.2.Extraction of onion seed oil

5.2.3. Extraction Of Pomegranate Seed Oil



Fig.5.3.Extraction of pomegranate seed oil

5.2.4. Extraction Of Grape Seed Oil



Fig.5.4.Extraction of grape seed oil

5.2.5 COLOUR AND APPEARANCE

**TABLE 5.1 ANALYSIS
OF COLOUR AND
APPEARANCE**

COLOUR	YELLOW
ODOUR	CHARACTERISTICS ODOUR
TEXTURE	SMOOTH HOMOGENOUS
HOMOGENEITY	GOOD
PH	6.79
WASHABILITY	WASHABLE

5.2.6 pH Of BODY OIL

A pH meter was calibrated using a standard buffer solution. Nearly 1 ml of the Body oil was properly weighed and dissolve in 50 ml of distilled water and finally its pH was calculated. The skin has ancidic range and the pH of the skin serum should be in the range of 6.79



FIG 5.5 PH METER

5.2.7 Irritancy Test

The prepared Cell repair facial serum was subjected for irritancy test and the results are shown in Table 5.2. The Facial serum formulation does not showed any sigh of irritation, redness and swelling during irritancy studies.

Table 5.2 Irritancy test

S.NO	PARAMETERS	OBSERVATION
1	Irritation	No
2	Redness	No
3	Swelling	No
4	Photo irritation	No irritation No redness No swelling

5.2.8 Rheological study- Determination of viscosity

Table 5.3 determination of viscosity

S. No	Parameters	Results
-------	------------	---------

1	Kinematic Viscosity @ 40 °c	32.41
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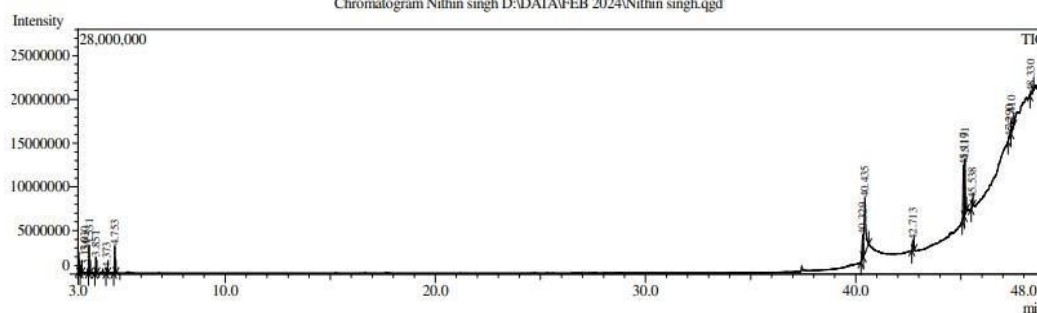
5.2.9 Stability Testing in Body oil:

Table 5.4 stability testing in body oil

TEMPERATURE	EVALUATION PARAMENTERS	Observation(months)			
		0	1	2	3
3-5°C	Visual appearance	Yellow	Yellow	Yellow	Yellow
	Phase separation	Nil	Nil	Nil	Nil
	Homogeneity	Good	Good	Good	Good
Room temperature (25°C RH=60%)	Visual appearance	Yellow	Yellow	Yellow	Yellow
	Phase separation	Nil	Nil	Nil	Nil
	Homogeneity	Good	Good	Good	Good
40°C±2°C (RH = 75%)	Visual appearance	Yellow	Yellow	Yellow	Yellow
	Phase separation	Nil	Nil	Nil	Nil
	Homogeneity	Good	Good	Good	Good

5.2.10 GCMS- GAS CHROMATOGRAPHY / MASS SPECTROMETRY

A graph that shows the intensity of different molecules over time as they separate in a gas chromatograph. The x-axis of the chromatogram is labelled "min", which stands for minutes. The y-axis is labelled "Intensity". The taller the peaks in the chromatogram, the more concentrated that molecule was in the sample.



The table in the chromatogram shows a "Peak Report TIC". TIC stands for total ion current. This table lists the retention time, area, and area% of each peak in the chromatogram. The retention time is the time it took for that molecule to travel through the gas chromatograph. The area is a measure of the intensity of the peak. The area% is the percentage of the total ion current that is from that peak. The name of each peak is also listed in the table(5.5). Some of the identified peaks include **31.46 9-Octadecenoic acid, 1,2,3propanetriyl ester, Bicyclo[10.1.0]tridec-1-ene,**

Table 5.5 peak report TIC

Peak Report TIC				
Peak#	R.Time	Area	Area%	Name
1	3.030	3584563	3.15	BENZENE, ETHYL-
2	3.136	1893154	1.67	BENZENE, 1,2-DIMETHYL-
3	3.531	6629110	5.83	2-PENTANETHIOL, 2-METHYL-
4	3.851	3823160	3.36	3-NONANONE
5	4.373	1137628	1.00	Pentane, 3-ethyl-2,4-dimethyl-
6	4.753	7347558	6.47	3-HEXEN-2-ONE
7	40.329	10784753	9.49	9,12-Octadecadienoic acid (Z,Z)-
8	40.435	35747393	31.46	9-Octadecenoic acid, 1,2,3-propanetriyl ester
9	42.713	2956267	2.60	HEXADECANOIC ACID, 2-HYDROXY-1,
10	45.117	15932855	14.02	Bicyclo[10.1.0]tridec-1-ene
11	45.191	17165393	15.11	9-Octadecenoic acid, 1,2,3-propanetriyl ester
12	45.538	2494181	2.20	Glycidol stearate
13	47.290	1129566	0.99	DODECANOIC ACID, 1,2,3-PROPANETR
14	47.410	1596645	1.41	Lauric acid, 2-(hexadecyloxy)-3-(octadecylo
15	48.330	1404162	1.24	LAURIC ACID, 2-(HEXADECYLOXY)-3-
		113626388	100.00	

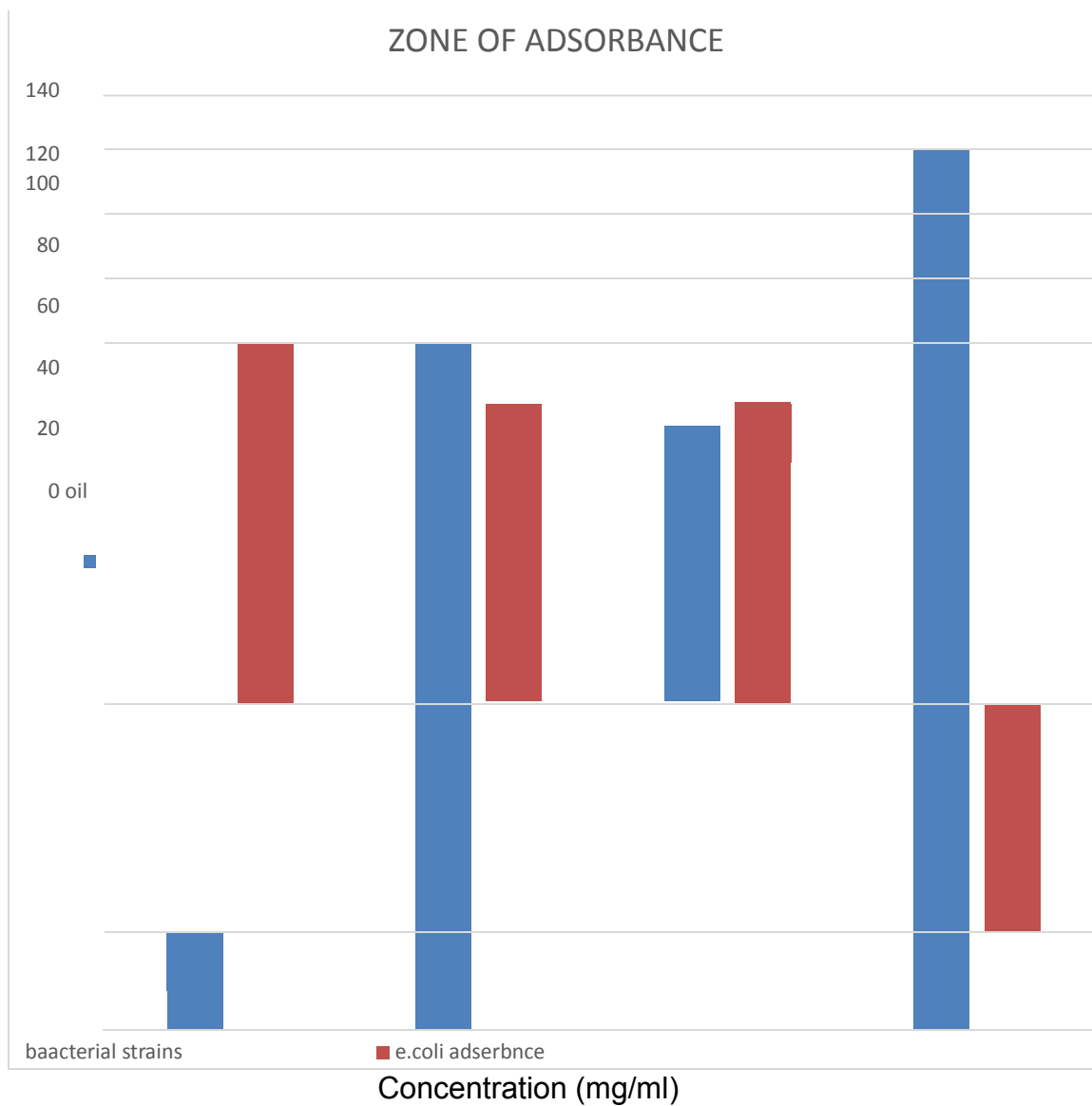
5.2.11 ANTI – MICROBIAL ASSAY**TABLE 5.6 ANTI – MICROBIAL ASSAY**

Sample name	Concentration(mg/ml)	Adsorbance (<i>E.coli</i>)
oil	30	98
	60	97
	90	86
	120	72

Observation as the concentration of the sample increases (from 30 mg/ml to 120 mg/ml), the zone of adsorbance appears to increase in *E. coli*

ANTIMICROBIAL ASSAY

OD VALUE





30□□□

60□□

90□□

120□

Fig 5.7 Anti-Microbial Assay

5.2.12 DPPH ASSAY

TABLE 5.7 DPPH ASSAY

Components	S1	S2	S3	S4	S5	Control
Sample(μl)	3	6	12	24	48	-
DMSO(μl)	47	44	38	26	2	50
DPPH(ml)	2.950	2.950	2.950	2.950	2.950	2.950
	Incubate at dark for 20mins					
OD at 570nm	-	-	-	-	-	-

The reaction mixture was incubated in dark condition at room temperature for 20 min. After 20 min, the absorbance of the mixture was read at 517 nm. 3ml of DPPH was taken as control.

The % radical scavenging activity of the plant extracts was calculated using the following formula.

$$\%RSA = \frac{\text{Abs control} - \text{Abs sample}}{\text{Abs control}} \times 100$$

Abs sample

Where, RSA is the Radical Scavenging Activity; Abs control is the absorbance of DPPH radical + ethanol; Abs sample is the absorbance of DPPH radical + plant extract.

Table 5.8 DPPH ASSAY -Sample – 1

Components	S1	S2	S3	S4	S5	Control
Sample(μl)	3	6	12	24	48	-

DMSO(μl)	47	44	38	26	2	50
DPPH(ml)	2.950	2.950	2.950	2.950	2.950	2.950
	Incubate at dark for 20mins					
OD at 570nm	0.152	0.145	0.122	0.81.3	0.112	0.214

Sample I was dissolved in DMSO (1mg/ml)

CALCULATION

$$\%RSA = \frac{\text{Abs control} - \text{Abs sample}}{\text{Abs sample}} \times 100$$

$$S1 = 40.7\% / 3\mu\text{g}$$

$$S2 = 47.58\% / 6\mu\text{g}$$

$$S3 = 75.4\% / 12\mu\text{g}$$

$$S4 = 81.3\% / 24\mu\text{g}$$

The sample I has the highest % of scavenging activity of 91%/48μg

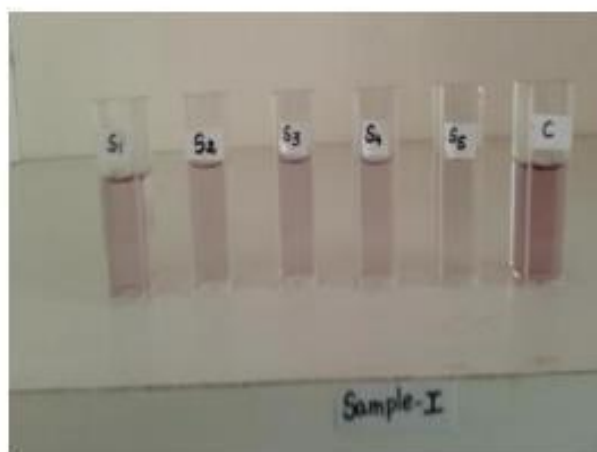


Fig 5.8 Sample 1

Sample 2

Table 5.9 DPPH Assay – sample 2

Components	S1	S2	S3	S4	S5	Control
Sample(μ l)	3	6	12	24	48	-
DMSO(μ l)	47	44	38	26	2	50
DPPH(ml)	2.950	2.950	2.950	2.950	2.950	2.950
	Incubate at dark for 20mins					
OD at 570nm	0.160	0.152	0.149	0.125	0.120	0.214

Calculation

$$\%RSA = \frac{\text{Abs control} - \text{Abs sample}}{\text{Abs sample}} \times 100$$

Abs sample

$$S1 = 33.75\% / 3\mu\text{l}$$

$$S2 = 40.79\% / 6\mu\text{l}$$

$$S3 = 43.62\% / 12\mu\text{l}$$

$$S4 = 71.2\% / 24\mu\text{l}$$

$$S5 = 78.3\% / 48\mu\text{l}$$

Sample II has highest % of scavenging activity of 78.3% /48μl



Fig 5.9 sample 2

5.2. SAMPLE 3

Table 5.10 DPPHY ASSAY SAMPLE 3

Components	S1	S2	S3	S4	S5	Control
Sample(μl)	3	6	12	24	48	-
DMSO(μl)	47	44	38	26	2	50
DPPH(ml)	2.950	2.950	2.950	2.950	2.950	2.950
	Incubate at dark for 20mins					
OD at 570nm	0.121	0.119	0.115	0.110	0.109	0.214

Calculation

$$\%RSA = \frac{\text{Abs control} - \text{Abs sample}}{\text{Abs sample}} \times 100$$

S1 = 76.85% /3μl

S2 = 79.83% /6μl

S3= 86% /12μl

S4 = 94.54% /24μl

S5 = 96.3% /48μl

Sample III has highest % of scavenging activity of 96.3% /48μl



Fig 5.10 Sample 3

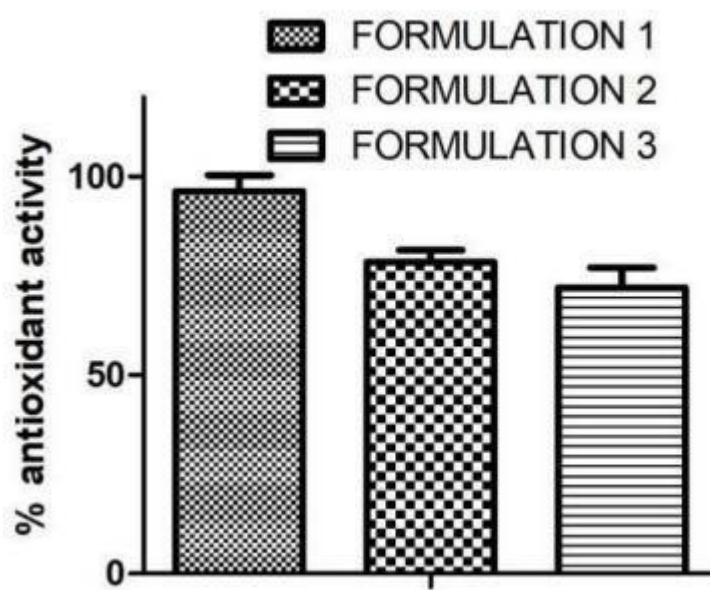
5.2.13 Statistical Analysis - Analysis of variance (ANOVA) on DPPH test

Statistical analysis of the DPPH test was carried using one-way Analysis of variance (ANOVA) followed by the post-hoc tests (Tukey's multiple comparisons test) with a significance level of 95%. (i.e., P value of 0.05) using GraphPad Prism version 5. The data was found to be significant

1way ANOVA				
1	Table Analyzed	Data 3		
2				
3	One-way analysis of variance			
4	P value	< 0.0001		
5	P value summary	***		
6	Are means signif. different? (P < 0.05)	Yes		
7	Number of groups	3		
8	F	38.07		
9	R squared	0.8943		
10				
11	ANOVA Table	SS	df	MS
12	Treatment (between columns)	1269	2	634.6
13	Residual (within columns)	150.0	9	16.67
14	Total	1419	11	
15				
16				
17				

Annova Table

Fig 5.11 One-way ANOVA on the DPPH absorbance using GraphPad Prism version 5 and found to be significant.



Percentage of antioxidant activity

1way ANOVA				
1	Table Analyzed	Data 1		
2				
3	One-way analysis of variance			
4	P value	0.0013		
5	P value summary	**		
6	Are means signif. different? (P < 0.05)	Yes		
7	Number of groups	3		
8	F	15.14		
9	R squared	0.7708		
10				
11	ANOVA Table	SS	df	MS
12	Treatment (between columns)	0.02341	2	0.01171
13	Residual (within columns)	0.00696	9	0.0007733
14	Total	0.03037	11	
15				

Fig 5.12 One-way ANOVA on the DPPH absorbance using GraphPad Prism version 5 and found to be significant.

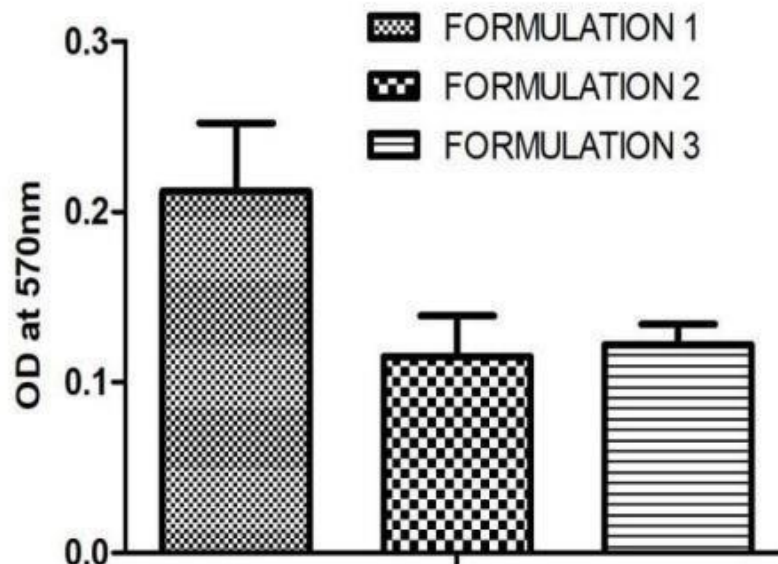


Fig 5.13 OD AT 570NM

Since the p-value is less than 0.05, we can reject the null hypothesis, which typically assumes there are no differences between the means of the groups. This suggests that there is a statistically significant difference in DPPH absorbance between at least two of the three groups.

ANOVA table	SS	DF	MS	F (DFn, DFd)	P value
Treatment (between columns)	2779	2	1390	F (2, 12) = 4.394	P=0.0370
Residual (within columns)	3796	12	316.3		
Total	6575	14			
Model comparison	SS	DF	Probability it is correct		
Null H: All population means identical	6575	14	34.96%		
Alternative H: Distinct population means	3796	12	65.04%		
Ratio of probabilities			1.860		
Difference in AICc			1.242		
Data summary					
Number of treatments (columns)	3				
Number of values (total)	15				

Fig 5.14 post-hoc tests (Tukey's multiple comparisons test)

The ANOVA confirms a statistically significant difference ($p < 0.0013$) in DPPH absorbance between at least two of the three groups. The post-hoc tests (Tukey's multiple comparisons test) reveal which specific groups are different. Sample 1 has a significantly different DPPH absorbance compared to both sample 2 and Sample 3 (p -values < 0.05). There is no statistically significant difference in DPPH absorbance between sample 2 and sample 3 ($p > 0.05$).

CHAPTER 6 SUMMARY AND CONCLUSION

Through my project I have observed that *the ficus carica, vitis vinifera, allium cepa, pinica garantum, sesamunidicum* these mixtures can be used as organic oil alternative to chemical infused oil.

The results of the GCMS analysis indicates that the organic body oil formulation contains a significant abundance of 9-octadecenoic acid, 1, 2, 3-propinetriyl ester.

The anti-oxidant test conducted on the organic body oil aimed to assess its impact on skin health upon contact anti-oxidants are known to enhance skin texture and appearance while protecting against damage results indicate that 78.3% of the organic body oil tested did not cause skin damage, highlighting its potential friendly and skin friendly properties.

The anti-bacterial test conducted aimed to evaluate the efficiency of organic body oil inhibiting bacterial growth, crucial for ensuring the safety and effectiveness of cosmetic product applied to skin or mucus membranes result indicates that the organic body oil effectively inhibits bacterial growth, underscoring its potential as a safe cosmetic option .

The ph test conducted on the organic body oil was crucial for determining is acidity level and assessing its compatibility with the skin. Result indicates the neutral ph, reassuring uses of its safety for skin application maintaining a neutral ph ensures that the product is gentle and less likely to cause irritation or disturb the skin natural balance. This finding underscores the organic body oil suitability for cosmetic use, offering uses a comfortable and skin friendly experience

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