IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

"FORMULATION AND EVALUATION OF HERBAL HAIR GEL FROM FLAXSEED EXTRACT"

[1]Shrutika S. Nimkar, [2]Yashwant S. Deshmukh

Abstract:

The Linumusita Tissimun, often known as flaxseed, is made from dried, ripe seeds belonging to the Linaceae family. The plant is cultivated worldwide for its fiber and seeds, with the biggest exporters being Morocco, Argentina, Belgium, Hungary, the United States, and India. When it comes to personal care, most people opt for natural products over chemical ones because the former are free of harmful chemicals, improve skin health, and provide customers with the necessary nourishment and delight. Thus, research on the application of flaxseed oil and mucilage in the production of cosmetic products has started. As a result, flaxseed-based multipurpose skin care products have been developed and evaluated. The recipe contains mucilage and flaxseed oil because of their very skin-beneficial fatty acid content, which is helpful in treating many inflammatory skin diseases, as well as their capacity to store both water and oil. Safe, nutritious, and naturally moisturizing skin care products can benefit from the physiochemical features of multipurpose skin care products. Additionally, it was observed that multipurpose skin care left the skin hydrated for up to 8–10 hours after application, reducing fine wrinkles and leaving the skin smooth and supple.

Keywords:

Herbal Hair Gel, Flaxseed, PVP (poly vinyl pyrrolidine)

2.Introduction:

Cosmetic:

The Food and Drug Administration of the United States has established an international definition of cosmetics; in India, on the other hand, the term is derived from the regulations set forth in the Drugs and Cosmetics Act 1940 and 1945. In actuality, the word "cosmetics" originated in Ancient Rome. These were generally made by female slaves referred to as "cosmetics," which is how the name "cosmetics" originated. The Greek word "Kosmetikos" is where the word "cosmetics" first appeared. This identifies the aptitude for decorating. Similarly, makeup items, sometimes referred to as cosmetics, are frequently used by young adults to enhance their appearance and convey them in a nice way. "Cosmetic's are pretended to be applied on the human body for beautifying, cleansing, changing the appearance, and attractiveness promotion without influencing or changing the functions of the body's structure," according to the US Food and Drug Administration.

Goal: Preserve the body's ideal state by shielding it from outside influences. in order to reduce the signs of aging. to provide natural protection and nourishment for our skin. various kinds of cosmetics

1. Skincare products: People's skin serves as their first line of defense against environmental dangers. Cosmetics that are rubbed, poured, or applied to the skin are referred to as skin cosmetics. creams, powders, and lotions.

2. Nail cosmetics: Nail plates on the hands and feet in particular have been employed as ornamental features to enhance shine or colour. such as remover and nail lacquers.

3. Use for the mouth and teeth: Dental care items are made to preserve the health, strength, and infection-resistant nature of the oral cavity. mouthwash, toothpaste, etc.

4. Use for the eyes: Bright lighting is required for beautifying because of the sensitivity and significance of the eyes. eye makeup, eyeliners, and mascara.

5. Use for hairs: Hair cosmetics, which include shampoos, colours, and sprays, are a class of products meant to preserve the health of hairs, including face, pubic, and other body hairs as well as hairs coming from then human scalp.

The goals Of Cosmetics.

1. Applying cosmetics can help one look better.

2. It is believed that the primary objective of cosmetics is to boost an individual's self-esteem and satisfaction with their appearance.

3. It must also possess the capacity to dazzle others.

Natural cosmetics have the following advantages over produced ones:

naturally obtainable Natural, easily accessible plants are used to make herbal cosmetics; no artificial, potentially harmful substances are used. Herbal cosmetics derived from easily accessible plant extracts and components might work just as well as synthetic ones. Aloe vera gel with coconut oil, for instance.[20] Additionally, they include organic vitamins C and E as well as other nutrients and skin-beautifying elements. One naturally occurring and widely available herbal plant species that is part of the Liliaceae family is aloe vera.[21] Mineral oils and other dangerous synthetic compounds that are used as ingredients in cosmetic goods are a source of concern for many individuals.

Safer to use: Compared to synthetic cosmetics, herbal cosmetics are safer to use. Dermatologists have studied them and found that they are nontoxic, less likely to cause allergies, and safe for use. considering that natural resources make up their composition.

Less negative consequences It is possible for synthetic beauty products to irritate your skin and cause rashes. On occasion, they could cause the skin's pores to clog, leaving it dry or oily. We don't have to worry about adverse responses when using herbal cosmetics. There are no hazards involved in using it to the skin because only natural ingredients were used. Herbal cosmetics, for example, do not contain parabens, the most ubiquitous and skin-piercing preservative in cosmetics. It could interfere with hormone function and result in an endocrine disorder.

Cost-effectiveness: The cost of natural cosmetics is acceptable. In actuality, some of these products are less expensive than synthetic ones. During sales, they are offered at a discount and sold for a reduced price. It merely takes a decent bit of surveying to find good deals. According to a WHO estimate, 80% of the world's population gets their medical needs from natural goods due to the limitations and growing expenses of conventional treatment. The World Health Organization supports and promotes traditional herbal therapies in natural health care programs because of their widespread safety and accessibility.[1][2]

Flaxseed:

Flax (Linum usitatissimum) is the name of the annual plant that belongs to the Linaceae family. This plant can grow up to 60 centimeters in height. It has lanceolate leaves with three veins that can grow to a length of 4 cm and a width of 4 mm, thin, very fibrous stems, and bright blue blooms that can grow to a diameter of 3 cm. Flaxseed, often known as linseed, is one of the fruit's seeds. Humans have eaten flaxseed since the dawn of civilization. It was used medicinally in ancient Egypt and Greece, mostly to cure stomach problems and as a source of energy. It is currently grown in more than 50 countries, the majority of which are in the northern hemisphere. China, the US, India, and Canada are the leading producers of flax. In

Chile, its manufacturing is incredibly limited. Most Canadian-imported seeds are consumed in either form. as an addition to or a part of prepared food. Up until a few years ago, flax was largely farmed in the Los Lagos region of southern Chile as a raw material for the textile industry. At the moment, the Araucania Region grows flax to make oil. Studies have revealed that the soil and climate of this area are factors in the higher agricultural output. Rich, loamy soils with tiny particles are perfect for growing flax. One major factor is the amount of rainfall that occurs during the growing season. neurological issues.

Use of flaxseed in cosmetics: Flaxseeds are used in cosmetics because its omega-3 fatty acids are thought to reduce inflammation and help prevent premature aging. Many customers claim that because the mask is gel-like and dries out and becomes hard when applied, it gives their faces a Botox-like affect. Flaxseed and other plant-based meals are rich in proteins, lipids, fiber, and other nutrients that can help you become healthier over time. Owing to their slightly nutty taste and crispy, crunchy texture, these seeds are often used in salad dressings, smoothies, yogurt, and sandwiches.

The Skin Benefits of Flaxseed:

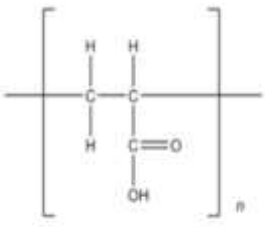
Flaxseeds include omega-3 fatty acids, which are thought to reduce inflammation and delay the onset of premature aging. Many customers claim that because the mask is gel-like and dries out and becomes hard when applied, it gives their faces a Botox-like affect. Does flaxseed help with skin health? Flaxseed can help your body manage its levels of oestrogen. The oil-producing glands in your skin may go into overdrive as a result of a shift in these levels, resulting in breakouts. It accomplishes this as well as unclogging your pores and clearing deposits and debris from your skin. The cleaner your pores are, the less obvious they will be. even does a fantastic job of illuminating your face. Its high concentration of antioxidants and omega-3 fatty acids help to gradually reduce pigmentation and scarring, revealing skin that looks brighter and healthier. Flaxseed can even quickly reduce redness and inflammation due to its anti-inflammatory properties. Flaxseed can promote collagen synthesis and enhance cell turnover due to its anti-aging properties and antioxidant content. This makes your face appear tighter and younger by making wrinkles and lines less noticeable.

Antioxidant Effects: Flaxseed contains a plant lignan called secoisolariciresinol diglycoside (SDG), which has been found to have antioxidant properties. Theoretically, flaxseed may increase lipid peroxidation, which would exacerbate oxidative damage.

Function of Inflammation: Flaxseed and flaxseed oil may have anti-inflammatory properties because of the presence of ALA, which in humans reduces neutrophil inflammatory responses when converted to EPA and DHA.[3][4][5][6]

Primary Function of The Component Utilized in The Formula

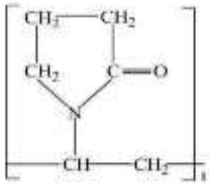
1.Carbomer, or Carbopol:



Thickening agent: Adds the necessary viscosity to goods like hair gels, shampoos, and face cleansers.

Emulsifying Agent: Prevents the separation of ingredients in creams and lotions by stabilizing oil-in-water emulsions.[7]

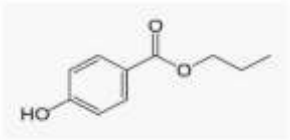
2.Poly vinyl pyrrolidone (PVP)/ Povidone



Hair Products: PVP's film-forming abilities, which offer grip and styling advantages, are utilized in hair sprays and gels.

Skincare: Serves as a stabilizer and binder for creams and lotions. Contact Lens Options: utilized due to its lubricating qualities**.**[8][9]

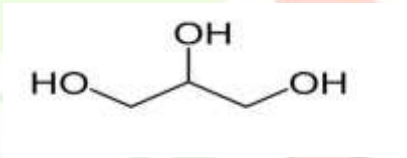
3. Methyl Paraben:



Preservative: To stop microbiological growth, methylparaben is frequently added to lotions, creams, shampoos, conditioners, and makeup products.

Antimicrobial Agent: It works to keep the product intact by preventing the growth of bacteria, yeasts, and mold.[10]

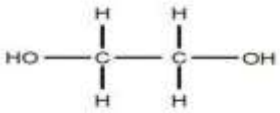
4.Glycerine



Moisturizer: Because of its hydrating qualities, it is frequently used in lotions, creams, and soaps. **Emollient**: The skin is soothed and softened.

Humectant: Assists in keeping shampoos and conditioners and other hair care products hydrated.[11][12]

5. Propylene Glycol:

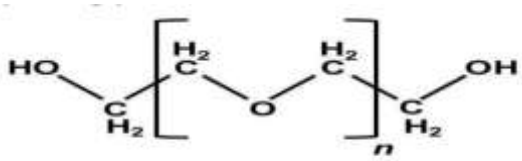


Moisturizer: Works in lotions, creams, and serums as a moisturizer and humectant.

Solvent: A substance used in cosmetics to dissolve and stabilize active components.

Preservative: By stopping microbial growth, it helps increase the shelf life of cosmetic items.[13]

6.Polyethleneglycol

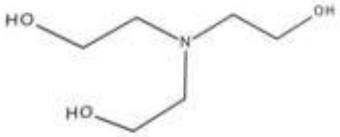


In lotions, creams, shampoos, and toothpaste, moisturizers serve as humectants and emollients.

Solvent: Used to improve the texture and spreadability of cosmetic products by dissolving active components.

Stabilizer: Aids in maintaining formulation stability and preventing ingredient separation.[14][15]

7. Triethanolamine:



As an emulsifier, pH balancer, and surfactant, TEA is frequently used in skincare and cosmetics products. It aids in thickening and stabilizing formulas such as shampoos, creams, and lotions.[16]

8. Flaxseed

Flaxseed's necessary fatty acids can enhance skin hydration and suppleness and encourage strong, healthy hair development. Because of these advantages, flaxseed oil is frequently utilized in cosmetic goods.[3][4][5]

Formulation of herbal hair gel from flaxseed extract

Preparation Of Extract

30 grams of flaxseed and 120 milliliters of water were added to a 250 milliliter beaker. After that, it was swiftly boiled in a water bath until a gel of the right consistency formed, and then filtered.

Phytochemical Screening:

1. Protein test:

(a) General test (Buret test): To 3 ml of T.S., add 4% NaOH and a few drops of 1%CuSO4 solution. The hue shifts to violet or pink.

(b) Mellon's test (for proteins): Mix 3 ml of T.S. White PowerPoint with 5 ml of Million's reagent. Warm. Ppt. either turns brick-red or dissolves to reveal a red solution.

2. The Molisch test (general test) for carbohydrates: To 2-3 ml of aqueous extract, shake a few drops of alpha-nap solution in alcohol. Then, add the concentrated H2SO4 from the test tube's sidewalls.At the intersection of two liquids, a violet ring appears.

3. Tannin Compound Test: Add a few drops of the following reagents to two to three milliliters of alcoholic or aqueous extract:

(a) A vivid blue-black solution containing 5% FeCl3.

(b) White ppt solution of lead acetate.

4. Alkaloids Test: Evaporate the aqueous, chloroform, and alcoholic extracts separately. Add 1 diluted to the residual. After giving it a thorough shake, strain. Proceed with the following tests using filtrate:

(a) Hager's test: adding Hager's reagent to 2-3 ml of filtrate produces yellow ppt.

5. Acidic Compound Test:

(a) Make effervescence in the test solution by adding sodium bicarbonate**.**

6.Saponin Glycoside Test:

Foam Test: Use water to agitate the medication extract or dry powder thoroughly. Stable, long-lasting foam was noted.[17][18]

Preparation of herbal Hair Gel:

An aqueous extract of flaxseed was prepared by adding flaxseeds to hot water and stirring constantly until a thick mucilage developed. After that, the mucilage was stored at room temperature until it was required once again after being filtered through the proper sieve. Five different herbal hair gel compositions were made using a simple gel manufacturing procedure and a Carbopol gel foundation. Measurable volumes of glycerine, polyethylene glycol, and methyl paraben were dissolved in around 35 milliliters of water in a beaker. The liquid was then rapidly stirred using a mechanical stirrer. 2g of optimized Carbopol 934 and PVP were gradually added to the beaker containing the liquid above while it was being swirled. Triethanolamine was then added gradually while being continuously agitated to form a gel structure. Different amounts of flaxseed aqueous extract (5%, 10%, 15%, 20%, and 25%) were finally added to Carbopol gel and swirled for about an hour in order to make F4, F4, F4, F4, F4, and F4 with 5%, 10%, 15%, 20%, and 25% flaxseed extract in F4 Carbopol gel formulation. The completed herbal gel formulations were stored at room temperature until a further inspection.

Table no. 1: Formulation of herbal hair gel

Formulation Code	F1	F2	F3	F4	F5
Aqueous extract of flaxseed %	5	10	15	20	25
Carbopol 934(g)	2	2	2	2	2
PVP(mg)	5	5	5	5	5
Methyl Paraben (mg)	75	75	75	75	75
Glycerine (ml)	3	3	3	3	3
PEG (ml)	6.25	6.25	6.25	6.25	6.25
Triethanolamine (ml)	0.5	0.5	0.5	0.5	0.5
Water (ml)	35	35	35	35	35

Evaluation Parameter:

1) Physical characteristics: The colour, smell, and look of the cream were noted.

2) Homogeneity: All generated gels were examined visually to ensure homogeneity after the gel formulations were set in the container. Their appearance and the existence of any lumps, flocculates, or aggregates were examined.

3) Washability: After applying hair gel, the hairs were examined while the timer ran.

4)pH: A digital pH meter was used to measure the pH of each hair gel composition.
After dissolving one gram of gel in 100 millilitres of distilled water, it was kept for two hours. The pH was measured after completely submerging the electrodes in the hair gel formulations. Each formulation's pH was measured three times, and the average results were determined.

5) Viscosity was measured using a Brookfield viscometer. A sufficient amount of gel was added to each wide mouth jar independently. The gel in the jar should be high enough to allow the spindly to be dipped. The spindle was set to run at 2.5 RPM. The formulas' viscosities were noted.

6) Determining extrudability: Metal tubes that could be folded up were filled with hair gel compositions. The material was forced into the tubes, and the formulations' extrudability was examined. The weight in grams needed to extrude a 0.5 cm gel ribbon in 10 seconds was used to assess the extrudability of the formulations. Table 3 displays the hair gel compositions' relative extrudability.[19][20]

Result And Discussion

1.Observation of Phytochemical Screening:

Fig 1. Test for protein

a)Biuret Test

b) millions Test

Fig 2. Test for Alkaloids

[Hager's Test]

Fig 3. Test for Carbohydrates

[Molisch's Test]

Fig 4. Test for Tannins Compound

a) Fecl3

b) Lead Acetate

Fig 5. Test for Acidic Compound Fig 6. Saponin Glycosides

a) Sodium bicarbonate **a) Foam Test**

Phytochemical Screening:

Test	Result
Protein	
a) Biuret Test	+
b) Millions Test	+
Alkaloids	
Hager's Test	+
Carbohydrates	
Molisch test	+
Tannins Compound	
a) Fecl3	+
b) Lead Acetate	+
Acidic Compound	
Sodium Bicarbonate	+
Saponin	
Foam Test	+

Positive (+) **Negative (-)**

- The phytochemical test of flaxseed extract showing positive result.

2.Physical evaluation:

The five formulations' states, textures, colours, and smells were examined in this test.

Table No.2: Physical Evaluation:

Sr. No	Parameters	Formulation
1	Colour	White
2	Odour	Pleasant
3	Texture	Smooth
4	State	Semisolid

3. Homogeneity:

The produced face mask's tactile and visual qualities were evaluated in order to determine its uniformity. The face mask feels good to the touch and looks good.

4: Washability: After applying a little amount of cream to the hand and washing it with tap water,it was discovered that the formulation was easily washable.

5. Viscosity: The viscosities of each formulation were found to range from 1,50,232 to 1,52, 876 cps. The results show that as the concentration of flaxseed extract increased from 5% to 20%, so did the viscosity of the formulations.

6. pH: The pH values of all the herbal gel formulations ranged from 6.7 to 7.3, indicating that they were appropriate for hair and that the formulation was air-compatible.

7. Determining extrudability: Good extrudability was shown by extruding all formulations from a metallic collapsible tube. Compared to F1, F2, and F3, F4 and F5 showed better extrusion properties.

Table no. 3: Evaluation of Herbal Hair gel:

Formulation Code	Physical appearance	Homogeneity	pH	Extrudability	Viscosity
F1	Translucent, pale, brown, smooth on application	Good	6.7	Good	1,50.232
F2	Translucent, pale, brown, smooth on application	Good	6.7	Good	1,50,798
F3	Translucent, pale, brown, smooth on application	Good	6.9	Good	1,51,354
F4	Translucent, pale, brown, smooth on application	Good	7.1	Excellent	1,51,785
F5	Translucent, pale, brown, smooth on application	Good	7.3	Excellent	1,51,876

Conclusion:

The composition of flaxseed hair gel strengthens hair and provides an appropriate base for treating the scalp, hence preventing hair loss. Five distinct formulations were created by mixing different amounts of flaxseed gel with the same amount of carbomer. The evaluation test demonstrates the exceptional extrudability of the hair gel formulations F4 and F5. The pH of F4 is 7.1, while the pH of F5 is 7.3. The F4 and F5 have viscosities of 1,51,785 and 1,51,876, in that order. Each recipe was evenly distributed. The high concentration of omega-3 fatty acids, antioxidants, and lignans in flaxseed extract are responsible for its anti-inflammatory, moisturizing, and skin-soothing properties. Regular use of a flaxseed face mask reduces redness, boosts skin moisture, and supports overall skin health. Further research and user input could lead to a deeper comprehension of its long-term benefits and effectiveness. Since it is thought that natural medicines are less likely to cause negative effects than synthetic and semi-synthetic ones, they are more commonly used. Herbal hair gels aid in repairing the numerous harms brought about by the chemicals found in a large number of commercially available products. Due to their high levels of omega-3 fatty acids and antioxidants, flaxseed and chia seeds are common components in hair gels that may help shield hair from damage and promote the growth of healthy hair.

REFERENCES

[1] Bennett, M. L., & Henderson Jr, R. L. (2003). Introduction To Cosmetic Dermatology. *Current Problems In Dermatology*, *15*(2), 43-83.

[2] Romanowski, P. (2015). An Introduction To Cosmetic Technology. *Int News Fats, Oils Relat Mater (Inf)*, *26*, 200-204.

[3] Hall Iii, C., Tulbek, M. C., & Xu, Y. (2006). Flaxseed. *Advances In Food And Nutrition Research*, *51*, 1-97.

[4] Soni, R. P., Katoch, M., Kumar, A., & Verma, P. (2016). Flaxseed—Composition And Its Health Benefits. *Res. Environ. Life Sci*, *9*, 310-316.

[5] Fale, S. K., Umekar, M. J., Das, R., & Alaspure, M. (2022). A Comprehensive Study Of Herbal Cosmetics Prepared From Flaxseed. *Multidiscip. Int. Res. J. Gujarat Technol. Univ*, *4*, 106-112.

[6] Shim, Y. Y., Gui, B., Wang, Y., & Reaney, M. J. (2015). Flaxseed (Linum Usitatissimum L.) Oil Processing And Selected Products. *Trends In Food Science & Technology*, *43*(2), 162-177.

[7] Aupova, R., Sakipova, Z., & Zemlicka, M. (2014). Study Of Rheological Properties Of Carbomer Gels. *Life Sci. J*, *11*, 25-27.

[8] Kurakula, M., & Rao, G. K. (2020). Pharmaceutical Assessment Of Polyvinylpyrrolidone (Pvp): As Excipient From Conventional To Controlled Delivery Systems With A Spotlight On Covid-19 Inhibition. *Journal Of Drug Delivery Science And Technology*, *60*, 102046.

[9] Awasthi, R., Manchanda, S., Das, P., Velu, V., Malipeddi, H., Pabreja, K., ... & Dua, K. (2018). Poly (Vinylpyrrolidone). In *Engineering Of Biomaterials For Drug Delivery Systems* (Pp. 255-272). Woodhead Publishing.

[10] Ishiwatari, S., Suzuki, T., Hitomi, T., Yoshino, T., Matsukuma, S., & Tsuji, T. (2007). Effects Of Methyl Paraben On Skin Keratinocytes. *Journal Of Applied Toxicology: An International Journal*, *27*(1), 1-9.

[11] Neumann, W. H. (2018). Glycerin (E) And Its History. In *Glycerine* (Pp. 7-14). Crc Press.

[12] Yu, J., Chen, S., Gao, J., Zheng, H., Zhang, J., & Lin, T. (1998). A Study On The Properties Of Starch/Glycerine Blend. *Starch-Stärke*, *50*(6), 246-250.

[13] Mortensen, B. (1993). Propylene Glycol. *Nord*, *29*, 181-208.1

[14] Harris, J. M. (Ed.). (1992). *Poly (Ethylene Glycol) Chemistry: Biotechnical And Biomedical Applications*. Springer Science & Business Media.

[15] Harris, J. M. (1992). Introduction To Biotechnical And Biomedical Applications Of Poly (Ethylene Glycol). *Poly (Ethylene Glycol) Chemistry: Biotechnical And Biomedical Applications*, 1-14.

[16] West, R. J., & Gonsior, S. J. (1996). Biodegradation Of Triethanolamine. *Environmental Toxicology And Chemistry: An International Journal*, *15*(4), 472-480.

[17] Yadav, R. N. S., & Agarwala, M. (2011). Phytochemical Analysis Of Some Medicinal Plants. *Journal Of Phytology*, *3*(12).

[18] Alachaher, F. Z., Dali, S., Dida, N., & Krouf, D. (2018). Comparison Of Phytochemical And Antioxidant Properties Of Extracts From Flaxseed (Linum Usitatissimum) Using Different Solvents. *International Food Research Journal*, *25*(1).

[19] Ramakrishna, S., & Gopikrishna, U. V. (2022). Formulation And Evaluation Of Herbal Hair Gel. *Sch Int J Tradit Complement Med*, *5*(2), 28-32.

[20] Bhardwaj, K., Mittal, I., & Pathak, D. (2024). Herbal Hair Gel: Formulation And Evaluation Of Physical Parameters.