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Formulation And Development Of Sesamum Indicum And Zingiber Offcinale **Containing Multipurpose Skin Care Emulgel**

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ABSTRACT

In the coming years, topical drug delivery will be used extensively to impart better patient compliance. Emulgel is a recent technique for topical drug delivery and it is suitable for hydrophobic drugs. Since it is also capable in enhancing spreadibility, adhesion, viscosity and extrusion. They will become a popular drug delivery system. Moreover, they will become a solution for loading hydrophobic drugs in a water soluble gel base. The above results support that formulated emulgel from natural source is new innovation and an alternative to conventional topical preparations as the combination of Natural oils. Sesame oil, Ginger oil, has shown strong antibacterial, antifungal, anti-inflammatory, anti-aging activity, suitable SPF for skin to protect against UV rays and provide smooth Beautifying attractive appearance to skin with lustrous and cleansing effect. Moreover, the stability study has shown no significant effect on the viscosity, homogeneity and pH of all emulgel formulations. In summary, natural oils emulgel formulation has fulfilled the pharmaceutical cosmeceutical requirements and considered safe for skin use.

Keywords: linoleic acid, geraniol, Water distillation, anti-inflammatory

INTRODUCTION:

Natural oils

A natural oil is a concentrated hydrophobic liquid containing volatile (easily evaporated at normal temperatures) chemical compounds from plants. Natural oils are also known as volatile oils, ethereal oils, aetheroleum, or simply as the oil of the plant from which they were extracted, such as oil of clove. A natural oil is "natural" in the sense that it contains the "essence of" the plant's fragrance—the characteristic fragrance of the plant from which it is derived. The term "natural" used here does not mean indispensable or usable by the human body, as with the terms natural amino acid or natural fatty acid, which are so called because they are nutritionally required by a living organism. Natural oils are generally extracted by distillation, often by using steam. Other processes include expression, solvent extraction, absolute oil extraction, resin tapping, wax embedding, and cold pressing. They are used in perfumes, cosmetics, soaps, air fresheners and other products, for flavoring food and drink, and for adding scents to incense and household cleaning products. Natural oils are often used for aromatherapy, a form of alternative medicine in which healing effects are ascribed to aromatic compounds. Aromatherapy may be useful to induce relaxation, but there is not sufficient evidence that natural oils can effectively treat any condition. Improper use of natural oils may cause harm including allergic reactions, inflammation and skin irritation, and children may be particularly susceptible to the toxic effects of improper use. Natural oils can be poisonous if ingested or absorbed through the skin.

Treat Your Skin to the Goodness of Natural Oils

- 1. Helps in Reducing Appearance of Scars Natural oils are induced with the goodness of natural ingredients and herbs which are a grey way to tackle skincare issues. They help in reduction of scars, stretch marks and are also beneficial in reducing signs of ageing like wrinkles and fine lines. It tightens the skin thus reducing wrinkles and repairs the skin, helping in fighting from sun damage as well.
- 2. **Reduces Itchiness**Itchiness and irritation can even lead to rashes on the skin. Tea tree oil is best known to tackle itchy sensation and redness. It also helps in preventing acne as it controls sebum production and gives natural nourishment to the skin. It is a great pick for tackling skin conditions like eczema
- 3. Soothes the Skin Natural oils tend to give a soothing and relaxing sensation to the skin, helping our skin rejuvenate. Known for their antiseptic and aromatic properties, ingredients like lavender, orange, lemon, etc. are a great pick for a de-stress skincare routine as they have soothing fragrance and also help in giving natural moisture to the skin.
- **4. Reduces Signs of Ageing** Our skin turns dull with age. Fine lines, wrinkles, etc. become a usual thing. Natural oils which come with the goodness of vitamin C are beneficial in controlling early signs of ageing. Lemon oil, orange oil etc. are a great pic to deal with signs of ageing. They improve elasticity and give you a youthful glow, making your skin supple and plump.
- **5. Improves Skin Texture** Change in weather often leads to change in texture of the skin and other issues, which makes it difficult for us to have a fixed skincare routine. Oils like bergamot and lemon helps in lightening the skin and also improves the texture. They have citrus properties and help in giving you a radiant glow

ACTIVE PROFILE

Sesame

Botanical name:Sesamum indicum.Family:Pedaliace

Sesame is a plant in the genus Sesamum, also called benne or gingelly. Numerous wild relatives occur in Africa and a smaller number in India. It is widely naturalized in tropical regions around the world and Sesamum indicumis cultivated for its edible seeds, which grow in pods. World production in 2018 was 6 million metric tons (5,900,000 long tons; 6,600,000 short tons), with Sudan, Myanmar, and India as the largest producers. Sesame seed is one of the oldest oilseed crops known, domesticated well over 3,000 years ago. Sesamum has many other species, most being wild and native to sub-Saharan Africa. S. indicum, the cultivated type, originated in India.

It tolerates drought conditions well, growing where other crops fail. Sesame has one of the highest oil contents of any Seed



Fig.No.1: Sesamum indicum.



Fig.No.2: Sesame natural oil in clear glass vial

Chemical constituent

Sesame seed is rich in oil, contains high amounts of (83-90%) unsaturated fatty acids, mainly linoleic acid (37-47%), oleic acid (35-43%), palmitic (9-11%) and stearic acid (5-10%) with trace amount of linolenic acid. Its lignans have been widely studied and are known to possess antiaging, anticancer, antidiabetic, anti-inflammatory, and antioxidant properties.

Uses and Benefits of Sesame Oil for Skin

Sesame oil, derived from sesame seeds, has been cherished for centuries due to its remarkable properties and versatility. One of the most notable sesame oil uses is its outstanding contribution to skincare, particularly for females. Sesame oil boasts an array of benefits for the skin, making it an invaluable addition to any beauty regimen.

It is rich in antioxidants, vitamins, and essential fatty acids, which collectively nourish and rejuvenate the skin. The natural antioxidants in sesame oil help combat free radicals, which can accelerate skin aging and cause various skin issues.

Moisturizes and Nourishes the Skin

Sesame oil is an excellent natural moisturizer that effectively hydrates the skin. Its emollient properties help lock in moisture, keeping the skin soft and supple. Regular application of sesame oil can prevent dryness and provide a long-lasting nourishment to the skin.

Anti-Aging Properties

The antioxidants present in sesame oil, including vitamin E and sesame, help combat free radicals and prevent premature ageing. These antioxidants neutralize the harmful effects of oxidative stress, reducing the appearance of wrinkles, fine lines, and age spots. Sesame oil promotes youthful-looking skin and maintains its elasticity

Protects Against Sun Damage

Sesame oil possesses natural sun-protective properties. It contains a natural SPF (sun protection factor) of around 4, which provides mild protection against harmful UV rays. However, it's important to note that sesame oil alone may not provide sufficient sun protection, so it should be used in conjunction with appropriate sunscreen.

Improves Skin Elasticity

Regular massage with sesame oil can improve skin elasticity by enhancing blood circulation and stimulating collagen production. This helps to firm up the skin, reduce sagging, and promote a more youthful appearance.

Treats Dry and Irritated Skin

Sesame oil's moisturizing and anti-inflammatory properties make it effective in soothing and relieving dry, itchy, and irritated skin. It forms a protective barrier on the skin, preventing moisture loss and reducing inflammation.

Ginger

Biological source- Zingiber officinaleL, belonging to family: Zingiberaceae

Ginger (Zingiber officinale Roscoe), which belongs to the Zingiberaceae family and the Zingiber genus, has been commonly consumed as a spice and an herbal medicine for a long time. Ginger root is used to attenuate and treat several common diseases, such as headaches, colds, nausea, and emesis. Many bioactive compounds in ginger have been identified, such as phenolic and terpene compounds.

The phenolic compounds are mainly gingerols, shogaols, and Paradols, which account for the various bioactivities of ginger. In recent years, ginger has been found to possess biological activities, such as antioxidant, anti-inflammatory, antimicrobial, and anticancer activities.



Fig.No.3: Zingiber officinale



Fig.No.4: Ginger natural oil in clear glass vial

Chemical Constituent

Essentials oil of ginger contains actives compounds such as terpens, oleoresin, zingiberol, zingiberone, and zingiberene (23.5%). Camphene, farnesene (12.0%), geraniol, β -bisabolene, neral, β -sesquiphellandrene (10.3%), linalool, α - pinene, citronellal, and bornel. It is rich in various chemical constituents, including phenolic compounds, terpenes, polysaccharides, lipids, organic acids, and raw fibers. The health benefits of ginger are mainly attributed to its phenolic compounds, such as gingerols and shogaols

Uses:

Ginger essential oil calms redness, kills bacteria, prevents skin damage and ageing. Its antioxidants properties can help protect the skin against free radicals and antiinflammatory and anti-antiseptic properties of ginger oil can help repair the appearance of the skin. It is also suitable for acne prone skin. When applied to the skin help even skin tone, improve elasticity, and fade scars. Ginger oil gently moisturizes skin, and is noncomedogenic for pores. Ginger oil is essentially antibacterial,

meaning that it kills acnecausing bacteria that might infiltrate your pores. This makes the purple flower perfect for preventing, calming, and healing painful acne breakouts

Extraction Methods of Natural Oils

Natural oils are used in a wide variety of consumer goods such as detergents, soaps, toilet products, cosmetics, pharmaceuticals, perfumes, confectionery food products, soft drinks, distilled alcoholic beverages (hard drinks) and insecticides. The world production and consumption of natural oils and perfumes are increasing very fast. Production technology is a natural element to improve the overall yield and quality of natural oil. The traditional technologies pertaining to natural oil processing are of great significance and are still being used in many parts of the globe. Water distillation, water and steam distillation, steam distillation, cohobation, maceration and enfleurage are the most traditional and commonly used methods. Maceration is adaptable when oil yield from distillation is poor. Distillation methods are good for powdered almonds, rose petals and rose blossoms, whereas solvent extraction is suitable for expensive, delicate and thermally unstable materials like jasmine tuberose, and hyacinth. Water distillation is the most favored method of production of citronella oil from plant material.

Sources of natural natural oil

Natural oils are generally derived from one or more plant parts, such as flowers (e.g. rose, jasmine, carnation, clove, mimosa, Sesame, lavander), leaves (e.g. mint, Ocimum spp., Ginger, jamrosa), leaves and stems (e.g. geranium, patchouli, petitgrain, verbena, cinnamon), bark (e.g. cinnamon, cassia, canella), wood (e.g. cedar, pine), roots (e.g. angelica, sassafras, vetiver, saussurea, valerian), seeds (e.g fennel, coriander, caraway, dill, nutmeg), fruits (bergamot, orange, lemon, juniper), rhizomes (e.g. ginger, calamus, curcuma, orris) and gums or oleoresin exudations (e.g. balsam of Peru, Myroxylonbalsamum, storax, myrrh, benzoin).

Methods of Producing Natural Oils

Regarding hydrodistillation, the natural oils industry has developed terminology to distinguish three types: water distillation; water and steam distillation; and direct steam distillation. Originally introduced by Von Rechenberg, these terms have become established in the natural oil industry. All three methods are subject to the same theoretical considerations which deal with distillation of twophase systems. The differences lie mainly in the methods of handling the material. Some volatile oils cannot be distilled without decomposition and thus are usually obtained by expression (lemon oil, orange oil) or by other mechanical means. In certain countries, the general method for obtaining citrus oil involves puncturing the oil glands by rolling the fruit over a trough lined with sharp projections that are long enough to penetrate the epidermis and pierce the oil glands located within outer portion of the peel (ecuelle method). A pressing action on the fruit removes the oil from the glands, and a fine spray of water washes the oil from the mashed peel while the juice is extracted through a central tube that cores the fruit. The resulting oil-water emulsion is separated by centrifugation. A variation of this process is to remove the peel from the fruit before the oil is extracted. Often, the volatile oil content of fresh plant parts (flower petals) is so small that oil removal is not commercially feasible by the aforementioned methods. In such instances, an odorless, bland, fixed oil or fat is spread in a thin layer on glass plates. The flower petals are placed on the fat for a few hours; then repeatedly, the oil petals are removed, and a new layer of petals is introduced. After the fat has absorbed as much fragrance as possible, the oil may be removed by extraction with alcohol. This process, known as enfleurage, was formerly used extensively in the production of perfumes and pomades. In the perfume industry, most modern natural oil production is accomplished by extraction, using volatile solvents such as petroleum ether and hexane. The chief advantages of extraction over distillation is that uniform temperature (usually 50° C) can be maintained during the process, As a result, extracted oils have a more natural odor that is unmatched by distilled which may have undergone chemical alteration by the high temperature. This feature is of considerable importance to the perfume industry; however, the established distillation method is

of lower cost than the extraction process. Destructive distillation means distilling volatile oil in the absence of air. When wood or resin of members of the Pinaceae or Cupressaceae is heated without air, decomposition takes place and a number of volatile compounds are driven off. The residual mass is charcoal. The condensed volatile matter usually separates into 2 layers: an aqueous layer containing wood naptha (methyl alcohol) and pyroligneous acid (crude acetic), and a tarry liquid in the form of pine tar, juniper tar, or other tars, depending on the wood used. This dry distillation is usually conducted in retorts and, if the wood is chipped or coarsely ground and the heat is applied rapidly, the yield often represents about 10% of the wood weight used.

Effect of Heat

Almost all constituents of natural oils are unstable at high temperature. To obtain the best quality oil, distillation must be done at low temperatures. The temperature in steam distillation is determined entirely by the operating pressure, whereas in water distillation and in water and steam distillation the operating pressure is usually atmospheric. All the previously described three effects, i.e. hydrodiffusion, hydrolysis and thermal decomposition, occur simultaneously and affect one another. The rate of diffusion usually increases with temperatures as does the solubility of natural oils in water. The same is true for the rate and extent of hydrolysis. However, it is possible to obtain better yield and quality of oils by: (1) maintaining the temperature as low as possible, (2) using as little water as possible, in the case of steam distillation, and (3) thoroughly comminuting the plant material and packing it uniformly before distillation.

Natural Oil Extraction by Hydrolytic Maceration Distillation

Certain plant materials require maceration in warm water before they release their natural oils, as their volatile components are glycosidically bound. For example, leaves of wintergreen (Gaultheria procumbens) contain the precursor gaultherin and the enzyme primeverosidase; when the leaves are macerated in warm water, the enzyme acts on the gaultherin and liberates free methyl salicylate and primeverose. Other similar examples include brown mustard (sinigrin), bitter almonds (amygdalin) and garlic (alliin)

Natural Oil Extraction by Expression Expression

Or cold pressing, as it is also known, is only used in the production of citrus oils. The term expression refers to any physical process in which the natural oil glands in the peel are crushed or broken to release the oil. One method that was practiced many years ago, particularly in Sicily (spugna method), commenced with halving the citrus fruit followed by pulp removal with the aid of sharpened spoon-knife (known as a rastrello). The oil was removed from the peel either by pressing the peel against a hard object of baked clay (concolina) which was placed under a large natural sponge or by bending the peel into the sponge. The oil emulsion absorbed by the sponge was removed by squeezing it into the concolina or some other container. It is reported that oil produced this way contains more of the fruit odor character than oil produced by any other method. A second method known as equaling (or the scodella method), uses a shallow bowl of copper (or sometimes brass) with a hollow central tube; the equaling tool is similar in shape to a shallow funnel. The bowl is equipped with brass points with blunt ends across which the whole citrus fruit is rolled by hand with some pressure until all of the oil glands have burst. The oil and aqueous cell contents are allowed to dribble down the hollow tube into a container from which the oil is separated by decantation. Obviously, hand pressing is impractical because it is an extremely slow process, e.g. on average only 2-4 lbs oil per day can be produced by a single person using one of these hand methods. As a result, over the years a number of machines have been designed to either crush the peel of a citrus fruit or crush the whole fruit and then separate the oil from the juice

PLAN OF WORK

- Selection of active
- Collection and Authentication

- Extraction Method
- Selection of base
- Formulation
- Preparation
- Evaluation
- Evaluation of extract
- Preliminary phytochemical screening
- Fourier Transform Infrared spectroscopy (FT- IR)
- Thermal analysis In vitro drug release study
- Drug release kinetics
- RSM Optimization data modelling
- Effect of enhancers on % drug release at Y.
- Optimization of Essential oils Containing Formulation

MATERIAL AND METHODOLOGY

A proper method has to be carried out while formulating the Multipurpose Skin Care Emulgel from Natural oils are as,

- 1) Selection of actives
- 2) Collection and Authentication
- 3) Selection of base
- 4) Formulation
- 5) Preparation
- 6) Evaluation

Methods: -

1) Selection of active

Sesame seed is rich in oil, contains high amounts of (83-90%) unsaturated fatty acids, mainly linoleic acid (37-47%), oleic acid (35-43%), palmitic (9-11%) and stearic acid (5-10%) with trace amount of linolenic acid. Its lignans have been widely studied and are known to possess antiaging, anticancer, antidiabetic, anti-inflammatory, and antioxidant properties. 2. Essentials oil of ginger contains actives compounds such as terpens, oleoresin, zingiberol, zingiberone, and zingiberene (23.5%). Camphene, farnesene (12.0%), geraniol, β -bisabolene, neral, β -sesquiphellandrene (10.3%), linalool, α - pinene, citronellal, and bornel. It is rich in various chemical constituents, including phenolic compounds, terpenes, polysaccharides, lipids, organic acids, and raw fibers. The health benefits of ginger are mainly attributed to its phenolic compounds, such as gingerols and shogaols.

Collection and Authentication

Natural oils were purchased from the Herbal Drug Supplier and authenticated in botanical department by botanist.

Selection of base

The main objective of the present study was to prepare a Multipurpose Skin Care Emulgel from Natural oils incorporated into the gel, hence gel base are used

Ingredients	Parts Used	Category
Sesame	Leaves	Anti-inflammatory Anti-oxidant properties.
Ginger	Fruits	Anti-oxidants. Anti- bacterial. Anti- antiseptic properties

EXPERIMENTAL WORK

Preparation of Emulgel

Emulgel are prepared by incorporating gel and emulsion. The emulsion and gel are prepared separately and mixed together. For preparing emulsion, aqueous phase and oil phase are taken separately and mixed together. Then the gel is prepared by using gelling agent. After preparing gel and emulsion, they are mixed with gentle stirring. The chemicals are used as oil phase are Water and alcohol are used as aqueous phase

Preparation of Natural oils emulgels

Emulgels were prepared by using varying concentration of penetration enhancers (Sesame oil, Ginger oil,) surfactants (Tween 80) shown in table 2. For formulating Natural oils emulgel, weight of each ingredient was adjusted according to their respected HLB (Hydrophillic-Lypophyllic Balance ratio). The gel phase was prepared by mixing the required weight of carbopol-940 in sufficient quantity of distilled water on continuous stirring to make lumps free. The oil phase of emulsion was formed by mixing required amount of all Oils (penetration enhancers) one by one in oil phase on continuous stirring. Oils was dissolved in methanol in separate volumetric flask and then mixed with oil phase on continuous stirring. Aqueous phase of emulsion was prepared by mixing tween 20 in small amount of distilled water. In required amount of propylene glycol (permeation enhancer), in water DMDM Hydentoin was added as preservative. Mixed this solution with aqueous phase on continuous stirring. Both oil and aqueous phases were heated separately at 70-80°C for 5-8 minutes and then cool them at room temperature. After cooling, oil phase was added slowly in aqueous phase on continuous stirring to make O/W emulsion (having HLB value 8.7-8.8). It is necessary to add these phases at room temperature because at high temperature droplets of oil will coalesce and at very low temperature, they will freeze. Mixed this O/W emulsion into gel phase on continuous stirring by aid of magnetic stirrer. pH was adjusted at 6.8 by adding Triethanolamine drop wise and required weight was obtained by adding distilled water on continuous stirring until required consistency was attained. These emulgel formulations were stored in aluminum collapsible tubes for evaluation

Physical evaluation of Natural oils emulgel

Physical evaluation of natural oil emulgel formulations including homogeneity, transparency, viscosity, texture, drug content and pH were inspected

Antibacterial activity

The all formulated emulgels were evaluated for their antibacterial activity through Ditch plate Technique Nutrient agar media was used for bacterial growth to see the bactericidal/bacteriostatic activity (Staphylococcus epidermidis). Then took the fresh pus from face pimple of any volunteer via the cotton and applied this pus by sterilized loop onto agar plate. Observed the bacterial growth at these plates after 24 h at 25°C±0.5. Then added optimized emulgel (1gm) in this agar plate. Now streak across the agar at right angle to the edge of plate and incubate for 24 h at 25°C±0.5. By using crystal violet dye, checked microbial growth under microscope.

RESULTS AND DISCUSSION

Determination of Natural Oils Solubility and partition coefficient (Ko/w)

The solubility of oils in n-hexane was 0.00407 ± 0.25 mg/ml, 0.00185 ± 0.45 mg/ml in methanol, 0.00084 ± 0.67 mg/ml in PBS (at pH 6.8).

The Partition coefficient (Ko/w) for oils was 3.6. From this value, it was shown that given drug comprised of about sufficient lipophilicity that is beneficial to develop the topical drug.

Physical evaluation of Natural Oils emulgel formulations

Physical characteristics like homogeneity, texture, pH, phase separation, viscosity and

Smoothness of all prepared Natural Oils emulgels were observed. Results have shown that all oils emulgel formulations were smooth, good homogeneity, transparent and lumps free. pH value of all formulations was lied in range of 6.7-6.8 ± 0.1, considered suitable for skin application. All formulations have good consistency as the viscosity of these has lied in range of 640-671*103 (cps). Spread ability values of all-Natural oil emulgel formulations were in range of 0.034±0.1 to 0.046± 0.1 g.cm/s while extrudability values of these formulations were lied in range of 0.95± 0.01 to 1.31 ± 0.01g/cm. Both these parameters have indicated that EG4 easily spread (0.042±0.1 g/cm) on applying small amount of the shear stress and having good extrudibility value (1.27± 0.01) proving its excellent consistency as compared to others. The changes were observed on human volunteers for any skin irritation/lesion/abrasion after each day and have reported no any lesion, skin irritation or abrasion on skin, confirmed its suitability to skin. The physical evaluation has revealed good homogeneity, transparency, viscosity, extrudibility, spreadability and stability for prolonged time period. The optimized Natural Oils emulgel has no skin irritation and has shown excellent results for skin care. The provided results are in accordance with previous reports.

Sr.no **Parameters Observation** Clear Translucent Gel 1 Color 2 Odor Aromatic 3 Good Consistency 4 pH 5.0 рH 5 **Viscosity** 293.15-343.15*

Non-irritant

Irritability

Table.No.2: Evaluation Parameter of Natural oil

Antibacterial activity

The result for antibacterial activity of optimized EG4 was 85% inhibition that confirmed its antibacterial effectiveness to skin against microbes. The optimized emulgel has strong antibacterial and antimicrobial activities, so considered safe for transdermal use. The similar findings have been reported in previous studies of herbal oils. Natural oil is a source of polyunsaturated fatty acids such as alpha-linoleic acid and related chemicals in Natural oil seem to decrease inflammation. Natural Oils have also good analgesic and anti-inflammatory activity due to the presence of vitamin

C. That is why optimized oils emulgel formulation has thought to be useful for rheumatoid arthritis and other inflammatory (swelling) diseases as literature supported.

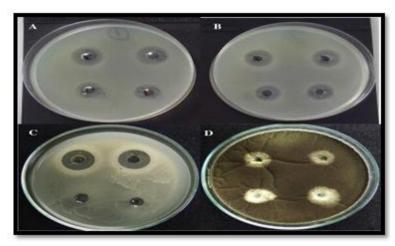


Fig.No.5: Antibacterial activity

CONCLUSION

In topical drug delivery system, a large number of formulations are used, but they also have their own disadvantages. Most of these disadvantages are overcome by emulgel preparation. The emulgel have proven as most convenient, better, and effective delivery system through the project. Incorporation of emulsion into gel makes it a dual control release system to further solve the problems such as phase separation, creaming associated with emulsion, and improvement of stability. Emulgel needs constituents as like the emulsion and gel preparation.

The preparation of emulgel is done with three steps; preparation of emulsion, preparation of gel and incorporation of these two preparation. Every formulation needs a proper evaluation. So, here also there are nearly twenty five types of evaluation methods, such as photo microscopy, Spreadability, rheological study, In-vitrodrug release study, etc. Nowadays, the emulgel is widely used. The most commonly used emulgels are Miconaz-H-emulgel, Isofenemulgel, Diclonemulgel, etc. Normally the emulgels are used as anti-inflammatory drugs

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