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Research Article

The Development And Assessment Of A Lotion Containing An Extract Of Moringa Oleifera L. Leaves With Varying Concentrations Of Cetyl Alcohol

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ABSTRACT

The moringa plant can be utilised in a variety of ways, including as a vegetable, an infusion for foetid, and as fodder for animals. On the other hand, the leaves of the Moringa plant are where the antioxidant capabilities of the plant are most readily seen. An assortment of antioxidants, including tannins, flavonoids, saponins, alkaloids, steroids, and terpenoids, can be discovered in the leaves of Moringa. To determine the appropriate concentration of triethanolamine to use in the production of lotion with moringa leaf extract, the purpose of this research was to determine the optimal concentration. In this particular investigation, an experimental methodology is utilised. Formula I had preparations that were rather thick in texture, formulae II and III also had preparations that were thick in texture, and all three formulas had the characteristic yellow colour and fragrance of Moringa leaf extract. The organoleptic test revealed that formula I had rather thick preparations. Generally speaking, Formula I had a pH of 6, Formula II had a pH of 7, and Formula III had a pH of 8. When it came to adhesion tests, Formulas I, II, and III all had averages of 02.76, 02.02, and 01.37 seconds, respectively out of a possible 3. Formula I produced an average spreadability test length of 4.1 centimetres, Formula II produced 7.6 centimetres, and Formula III produced 7.6 centimetres. Specifically, the results of the research indicate that lotion formulations that contain a triethanolamine concentration of 2.5% perform exceptionally well.

Keywords: Moringa, Anionic surfactants, emulsifier, alkalizing component, Spreadability ect.

Introduction

Historically, people have relied on medicinal plants based on their characteristics, which have been passed down through many generations in step with the ever-increasing pace of technological advancement. The search for long-lasting, realistic, user-friendly, and quickly applied cosmetic preparations is one way that the aesthetics industry is promoting a return to nature. The antioxidant properties of moringa leaves have long been recognized [1]. A large portion of biomolecules are protected from oxidative damage by the antioxidants included in Moringa leaves, which have the ability to neutralize free radicals. According to a study skin that is subjected to free radicals will age prematurely, resulting in wrinkles and black patches. This provides the basis for the idea that lotion compositions containing Moringa leaves can be used as an antioxidant [2]. Applying a lotion to your hands or body is a great way to enhance their appearance. According to the lotion can take the form of a suspension or an emulsion consisting of oil and water that includes an appropriate surfactant. Lick preparations are preferred over other topical preparations due to their emulsion nature, which makes them easy to wash off with water and does not leave a sticky residue. Lotion preparations are also convenient because they spread quickly and evenly over the skin, and they have a high spreading and penetration power without leaving behind an oily residue [3].A typical emulsifier and alkalizing component in topical treatments is triethanolamine. Topical treatments often contain a concentration of 2-4% triethanolamine as an emulsifier [4]. As an alkalizing agent, triethanolamine has a pH of 10.5. Anionic surfactants that are soluble in water include triethanolamine. The goal of this study is to determine the optimal triethanolamine content for lotion formulations and to assess various lotion preparations.

Tools and Materials for preperation of Moringa lotion[5]

This experiment calls for a number of specific tools, including an evaporating cup, a stirring rod, a measuring cup, a beaker glass, a pipette, an analytical balance, some glass, some universal pH paper, a viscometer, a blender, a funnel, and a lotion bottle. The specific tools used include a mini digital scale 1-2000, a pyrex object, a merck universal pH paper, a Phillips blender, a pyrex funnel, a wide selection of glassware as well. Cetyl alcohol, lanolin, glycerol, triethanolamine, methyl paraben, distilled water, and Moringa leaf extract are the components that make up the product under consideration.

Method of preparation of Moringa Lotion

Preparation of Moringa Leaf Extract[6]

A maceration technique utilising a 96% ethanol solvent was employed for the extraction process. A total of 1,700 milliliters of solvent was poured into a glass container. and 300 gram of Moringa leaf simplicial powder. The mixture was covered with aluminium foil and let to soak for three days, shaking occasionally. After removing the soak with a croton cloth, the macerate was left to stand. The simplicial powder remnants were resoaked with 1,200 ml of fresh solvent and let to sit for two days. After squeezing the marinade once more, pour the maserate

Phytochemical Screening of Moringa Leaf Extract[7,8]

Add 10 millilitres of 96% ethanol to 1 gram of Moringa leaf extract in a glass beaker, stir until dissolved, then filter. To test for flavonoid chemicals, transfer 1 ml of filtrate to a test tube, add 10% sodium hydroxide reagent, and observe a colour shift to orange or yellow.

The process of creating a lotion formulation[9,10]

Melting the oil and water phases together is the first step in making lotion. You can see the ingredients in the lotion made from Moringa leaves in table 1. Glycerol, triethanolamine, methyl paraben, and distilled water are the components that make up the water phase, whereas cetyl alcohol, stearic acid, and lanolin are the components that make up the oil phase.

Mixing the oil and water phases gradually while stirring ensures a homogenous mixture. Add 10 drops each of moringa leaf extract and scent to the two ingredients; whisk until combined; gradually add distilled water until 100 ml of ad emulsion is created.

Table 1. Formulation of Moringa lotion preparation[11]

	Formulation (grams)			
Material Name	**FI**	**FII**	**FIII**	**Function**
Moringa Leaf Extract	3.5	3.5	3.5	Active substance
Cetyl Alcohol	3.5	3.5	3.5	Thickener
lanolin	1.5	1.5	1.5	Softener
Stearic Acid	5	5	5	Emulsifier
glycerol	3	3	3	Moisturizer
Triethanolamine	1	3	5	Emulsifier

Methyl Paraben	0.1	0.1	0.1	Preservative
Fragrance (Lime)	08 drops	08 drops	08 drops	deodorizer
Aquadest	Add 100	Add 100	Add 100	Solvent

Evaluation Parameter of Moringa lotion preparation[12-14]

1. Sensory Evaluation

In order to conduct an organoleptic assessment, the components of lotions were evaluated, which included analyzing their color, aroma, and texture.

2. Test for Homogeneity

To check for lotion homogeneity, a tiny amount was taken, placed between two glass items, and watched.

3. Test for Viscosity

To conduct the viscosity test, the lotion mixture was transferred to a beaker with a glass top, and then the apparatus was fastened with rotor number 4. Once the reading on the instrument has levelled out, the viscosity value will show.

4. pH test

After shaking the mixture until it was completely dissolved, a lotion sample that weighed one gram was combined with ten milliliters of aquadest. The mixture was then analyzed with universal pH paper and a pH indicator.

5. Test for Stickiness

On the object glass, you'll find lotion up to 0.25 gram. The lotion is covered with another object, a glass, and subjected to a weight of 1 kg for a duration of 5 minutes. The item glass is fastened to the tool and the 80 Gram weight is let go at the same time as a consequence of stickiness.

6. Testing for Spreadability

Put half a millilitre of lotion in the centre of a 9-centimeter-diameter gadget, put another glass on top, and let it sit for one minute. Once the lotion's spreading diameter has been measured, 50 grammes of extra weight is added and the mixture is allowed to stand for 1 minute. One measure is the spreading diameter.

1. Methods for the Processing of Moringa Leaf Extract

A yield value of 26.13% is achieved by the extraction process, which results in the production of a concentration of 78.4 grams.

2. The Use of Moringa Leaf Extract for Screening

In the tests that were conducted, flavonoid compounds were examined. A reagent containing

10% sodium hydroxide is utilized, and the color changes to orange or orange.

Table 2. Organoleptic test results of Moringa lotion preparation [15]

Observation	Formulas Type			K(+)
	I	II	II	

Texture	Mild dense	Dense	Dense	Dense
Smell	Aromatic	Aromatic	Aromatic	Aromatic
Color	Deep yellow	Deepyellow	Deep yellow	Offwhite

Table 3. Moringa lotion homogeneity test results [16]

Replication	Type I	Type II	Type III	Positive Control
I	Not uniform	Uniform	Uniform	Uniform
II	Not uniform	Uniform	Uniform	Uniform
III	Not uniform	Not uniform	Uniform	Uniform

Table 4. Viscosity Test results of Moringaotion [17]

Replication	Type I	Type II	Type III	Positive Control
First	1,700 c. Ps	6,000 c. Ps	1,800 c. Ps	22,000 c. Ps
Second	1,600 c. Ps	8,000 c. Ps	1,600 c. Ps	22,200 c. Ps
Third	1,800 c. Ps	6,500 c. Ps	1,500 c. Ps	22,000 c. Ps
Mean ± SD	1700 ± 100	6800 ± 1212	1,600 ± 208	22,033 c. Ps

Table 5.pH test results of Moringalotion [18]

Replication	I	II	III
FI	acidic	acidic	acidic
FII	Neutral	Neutral	Neutral
FIII	Acidic	acidic	acidic
K(+)	Neutral	Neutral	Neutral

Table 6. Stickiness Test Results of Moringalotion [19]

Replication	Type I	Type II	Type III	K(+)
I	02.40 sec	02.50 sec	01.90 sec	02.10 sec
II	02.32 sec	02.20 sec	02.41 sec	02.22 seconds
III	02.20 sec	01.70 sec	01.40 sec	01. 00 seconds
Mean ± SD	02.37 ± 0.575	02.10 ± 0.510	01.87 ± 0.202	01.70 seconds

Table 7. Result of the spreadability test performed on Moringa lotion [20]

Replication	Type I	Type II	Type III	Positive Control
I	4.0cm	7.4cm	7.6cm	5.5cm
II	3.8cm	7.8cm	7.8cm	7.7cm
III	4.6cm	7.5cm	7.3cm	6.8cm
Mean ± SD	4.1 ± 0.808	7.6± 0.300	7.6 ± 0.450	6.6cm

Table 8 pH Stability Test Results of Moringa lotion

Storage condition	Type I	Type II	Type III
Cold temperature			
Before (H 1)	acidic	Neutral	Alkaline
After (H 30)	acidic	acidic	Neutral
Humid Place			
Before (H 1)	acidic	Neutral	Alkaline
After (H 30)	acidic	acidic	Neutral
Direct Heat			
Before (H 1)	acidic	Neutral	Alkaline
After (H 30)	acidic	acidic	Neutral

Result and Discussion

Formation of Moringa Leaf Extract

Because it is easy and frequently used, the cold method—specifically, the maceration method—is employed to make Moringa leaf extract. Five days of maceration were completed, with solvent changes occurring on day three.To preserve the flavonoid components in the Moringa leaf extract, the filtered maserate is concentrated at low heat.

Screening of Moringa leaf extract for its phytochemical properties

The solution turns orange when 10% NaOH reagent is added. Moringa leaf extract contains flavonoids, which, when combined with sodium hydroxide, produce the red quinoid chemicals depicted in Figure 1.

Preparation of Moringa Lotion

The emulsifying response between stearic acid and triethanolamine is observed in both type II and type III systems through the formation of a saponification reaction, which is caused by changes in variations of triethanolamine during production. Because compounds with greater melting points solidify at different temperatures, it is necessary to utilise high temperatures while making lotion, mortar, and stamper preparations.

Everything that has been prepared falls under the category of oil-in-water (O/W) emulsions. It is possible to determine the type of emulsion by determining whether or not an emulsifier, in this case triethanolamine, is present. Triethanolamine is more soluble in water and functions as a solvent. Table 2 displays the results of the organoleptic test. Because more aquadest is used in type I, making the texture very thick and separating the oil and water phases, the texture of lotion formula I differs from type II and III. Moringa leaf extract, which is often characterised by its deep yellow colour and aroma, is used to make the lotion.

Due to the absence of triethanolamine, an emulsifier, Table 3 reveals that formula I is not homogenous, with the oil and water phases separated. Because the technique of stirring when mixing, such as persistent stirring, also influences the homogeneity of the mixture, type II replication III is not homogeneous.

Lotion formulations must pass a viscosity requirement test with a range of 2000–50,000 c.Ps, and the results should fall somewhere between 1500 and 9,400 c.Ps. Table 4 demonstrates that no replication formula was suitable since the mixture created a liquid emulsion, which is not acceptable for the preparation. Because of inadequate testing preparation—specifically, not submerging the rotor—the results show that Formula III does not satisfy the viscosity standards, although Formula II does. This is due to the fact that triethanolamine serves as an emulsifier rather than a thickening in the recipe.

In order to ascertain the preparation's safety for usage, a pH test is performed to ascertain its acidity and basicity. Topical medicines must adhere to a pH range of 4.5 to 8.0. A universal pH scale ranging from 5-8 is employed in the test. The results of the pH tests are displayed in table 5. Because varying amounts of triethanolamine were used in each formula, the outcomes varied. This is due to the fact that triethanolamine has a pH of 10.5 and that an increase in concentration will result in a rise in the pH of the preparation. As a rule of thumb, the lotion should adhere to the skin for no more than four seconds after the adhesion test. Results averaged out at 02.76, 02.02, and 01.37 seconds for the three different formulas. The discrepancy in outcomes is due to the fact that the tool's lever is pulled with varying speeds and strengths, resulting in varying time calculations.

A significant result of 0.825 (> 0.05) was obtained using the Shapiro-Wilk test, which was utilised for statistical testing of the normality. Carried out to demonstrate that the lotion has spread across the skin at the injection site, with a spread of 5-7 cm. The active ingredients can be applied uniformly to the skin with the help of lotions with excellent spreading capacity. There were no significant differences observed in the spreadability test when examining variations in triethanolamine concentration, Reason being, the preparation's spreading capability increases as the amount of triethanolamine increases.

To determine whether there was a change in pH value after one month of storage, the pH stability test was performed on the preparation. Over a range of 4–7, the measured pH values dropped. Lotion formulations have a pH tolerance of 4.0-7.5, which allows them to be used on the skin even after a month of storage at different temperatures. The preparation's pH stability is checked to make sure the lotion is safe to use even after being stored for about a month. Because lotion is applied to the skin, it is crucial to control the pH parameter of the preparation in order to ensure its safety. Too harsh of an acidic or alkaline product could irritate the skin.

CONCLUSION

A lotion preparation with a concentration of 2.5% triethanolamine was found to be the most effective formulation, according to the results of the preparation performance evaluation. The findings of the test indicated that the most effective formulation was a lotion preparation, and moringa leaf extract can be made in the form of a lotion.

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