

Formulation and evaluation of polyherbal cold cream

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ARTICLE DETAILS	ABSTRACT
<p><i>Article history:</i> Received on 26 February 2021 Modified on 05 September 2022 Accepted on 15 September 2022</p> <hr/> <p><i>Keywords:</i> Cold Cream, Water in Oil Emulsion, <i>Mentha arvensis</i>, Neem Oil.</p>	<p>Cosmetics are an useful product commonly used worldwide to preserve and enhance the general appearance of the face and other parts of the body, such as skin, eyes, hair, hands, etc. The formulations representing cosmetics associated with active bio-ingredients, neutraceuticals, and pharmaceuticals are herbal cosmetics. The object of the present study was to formulate and evaluate the herbal cold containing plant extracts prepared for the nourishing and moistening of the skin using the water in oil method. The neem oil and extract of <i>Mentha arvensis</i> is used to prepare the cold cream. Using different evaluation techniques, the quality assessment of the formulated product was measured. No shift was observed in the physical properties of the formulated cream. During the study period of testing, the formulated cream demonstrated good consistency and spread ability, homogeneity, pH, non-greasy, no evidence of phase separation. Stability parameters such as visual appearance, nature, viscosity and fragrance of the formulated cream showed that during the research era, there was no significant variation. The cooling and relaxing effect is provided by the herbal extract containing cold cream due to the gradual evaporation of water contained in the emulsion. Cold creams are more moisturising because they have an oily barrier that eliminates the leakage of water from the outermost layer of the skin, the stratum corneum. They are water-in-oil emulsions and are intended to be applied to the skin or to the accessible mucous membrane to give the application site a localised and often systemic effect.</p>

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INTRODUCTION

The preparation representing cosmetics associated with active bio-ingredients, neutraceuticals, and pharmaceuticals is herbal cosmetics [1]. Cosmetics are items used to cleanse the skin and to beautify it. Egyptians are credited with the first recorded use of cosmetics in 4000 B.C. In essence, pharmaceuticals are drug products and are classified as products that prevent, alleviate, treat or cure illnesses and affect the body's structure or function. Via the European Directive (European commission) [2]. Cosmetic products are defined as any material or preparation intended to be put in contact with the various outer parts of the human body (epidermis, hair system, nails, lips, etc.) or with the teeth and mucous membranes of the oral cavity solely or primarily for the purpose of cleansing them, altering their appearance or

correcting the odours of the body and protecting or correcting them. The water in the oil emulsion is a cold cream. Compared to the other semi-solid dosage form or formulation, cold cream gives extended contact time at the application site. They add beauty to the face, and it's not so greasy [3]. Due to the oil process, the skin is emollient. The cold cream has the purpose of restoring moisture to dry skin, removing waste materials from the pores and cooling the body [1]. It is washable and easy to wash away with easy watering. When applied to the skin, they are not unpleasant. The water step gives the skin extra preservation. At body temperature, it becomes liquefied. It is penetrated via the natural pores through the epidermis of the skin. Under the Drugs and Cosmetics Act, cosmetics are described as articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into

or otherwise applied to the human body or any part thereof for cleaning, beautifying, promoting or altering the appearance of attractiveness [4].

In modern times, Ayurvedic cosmetics, also known as herbal cosmetics, have the same valuable assets as well. There is a broad range of herbal cosmetics that are manufactured for daily purposes and are commonly used. The masses highly applaud herbal cosmetics such as herbal face wash, herbal conditioner, herbal soaps, herbal shampoo, and many more. The best thing about herbal cosmetics is that the herbs and shrubs are purely made from them. Instead of enriching the body with nutrients and other helpful minerals, the natural content of the herbs has no side effects on the human body. Herbal cosmetics consist of florals such as ashwagandha, sandal (chandan), saffron (kesar) and many more which all the other essential components are augmented with good nutrient sand. Cosmetics are products which use herbs in the form of crude or extracts [5]. Deep in the Rigveda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine, the basic idea of skin care cosmetics lies. In this modern era, herbal knowledge and expertise are being combined with advanced cosmetic technology to create a natural and elegant beauty product that is appropriate to a wider range of people. It is, basically, beauty invented by nature and mastered by technology. Herbs have the benefit of having no or least negative effects and have a large variety of customer enforcement. Of the approximate Rs 2000 crores in the total cosmetic industry in the country, the herbal cosmetic market has a share of nearly Rs 200 crores [6]. The overall demand for cosmetics is rising at an annual pace of 20-25 percent. Around 60 % of this growth is that of the herbal cosmetic market. In diseases such as heart issues, digestive disorders and mental exhaustion, herbal extracts in liquid and other types have proven to be a panacea. In certain cases, the accuracy of herbal extracts was detected more than that of English medicines that normally consist of complex chemicals. Herbal extracts are much less likely than any other herbal products to have side effects. That's why herbal extracts are claimed to be the same remedies and medications as the common man. Also, herbal extracts have shown commercial aspects.

The corn mint, field mint, or wild mint, *Mentha arvensis*, is a flowering plant species in the Lamiaceae mint family. It has a circumboreal

distribution, native to Europe and western and central Asia's temperate areas, east to the Himalaya and eastern Siberia, and North America. Some authors also include in *Mentha arvensis* the similar species *Mentha canadensis* as two varieties, *M. arvensis* var. *glabrata* Fernald (North American plants such as American Wild Mint) and *M. arvensis* var. *piperascens* Malinv. ex L. H. Bailey (eastern Asian plants such as Japanese mint). Neem oil is a vegetable oil pressed from neem (*Azadirachta indica*) fruits and seeds, an evergreen tree native to the Indian subcontinent that has been spread to many other regions in the tropics. Neem is the most important commercially available neem plant for organic farming and for medicinal products [7-8].

The ideology of Green chemistry calls for the development of new chemical reactivities and reaction conditions that can potentially provide benefits for chemical syntheses in terms of resource and energy efficiency, product selectivity, operational simplicity and health and environmental safety [8].

Conventional method of organic synthesis usually requires longer heating time, tedious apparatus setup which result in higher cost of process and the excessive use of solvents or reagents lead to environmental pollution. Growth of green chemistry holds necessary potential for the reduction of by product, a reduction in the waste production and a lowering of energy cost. Due to its ability to couple directly with reaction molecule and passing thermal conductivity leading to fast rise in the temperature microwave irradiation had used to improve many organic syntheses. Experiments have proved that microwave, in comparison with the Soxhlet extraction, use a lesser volume of solvent and sample and perform extraction at a much faster rate were previously reported for various plant extraction [9].

Herbal extracts are grown all over the globe and are common in the horticulture industry. Masses are floating into nature in the present, and from it are prepared many cosmetics, trendy objects and others. Cosmetics made up of Antimark herbal extracts are very common for their reliability, fairness, cleaning and hair care. Later, in order to prepare herbal extracts, the liquefied juice is combined with essential substances. A large variety of herbal extracts exist, to name a few: *Andrographis Paniculata* (Kalmegh),

Asparagus Racemosus (Shatawari), Boswellia Serrata (Salai Guggal), Asphalt (Shilajit), etc. Azadirachta Indica (Neem), Bacopa Monnieri (Brahmi), Camellia Sinensis (Green tea) etc. are several other commonly used herbal extracts. In addition to this, some of the main herbal extracts used are Centella Asiatica (Mandukparni), Cassia Angustifolia (Seenai), and Chlorophytum Borivilianum (Safed Musli). Herbal cosmetics are effectively retained with the following benefits:

- Being the normal, least harmful effect on the skin or any part of the body.
- Relatively more safe.
- More placebo effect to the consumers due to its use in tradition and culture.
- Flexibility in formulation.
- Population proves effects from ancient time.
- Easy availability [10].

MATERIALS AND METHODS

Herbal pure neem (*Azadirachta indica*) oil procured from the local market and *Mentha arvensis* also procured from the local market. Chemicals used are of Analytical reagent (AR) grade (LOBA Chemicals Ltd.).

Preparation of Extract

Shade drying was done for almost a month to prevent sunlight chemical degradation. The dried material was grinded and transformed in coarse powder with the aid of a grinder. The extraction of *Mentha arvensis* with solvent methanol was carried out by microwave extraction, and excess solvent present was evaporated.

Preparation of Polyherbal Cold Cream

Formulation can be prepared by adding two different phases which are as follows.

Phase 1: Melt the solid ingredients by indirect heat then add all the oils in it and stir well.

Phase 2: Dissolve the borax in water with the help of heat.

While still hot, gradually add Phase 1 with constant stirring to the wax and oil mixture into Phase 2. Stir all the time, then remove from the heat and stir until it gets cold. Continue this process for 5 minutes. This cream may be made heavier by adding more wax compared to other creams.

Table 1: Formulation Table for Herbal Cold Cream (for 100 gm)

Sr. no.	Ingredients	Quantity
1	Bees wax	15 gm
2	Jojoba oil	1.5 mL
3	<i>Mentha arvensis extract</i>	9 gm
4	Neem oil	46 mL
5	Coconut oil	1.5 mL
6	Powered borax	0.5 gm
7	Rose water	26 mL

Evaluation of Cream:

Physical Properties:

The cream was observed for the color, odor and appearance.

Washability

The cream was applied on the hand and observed under the running.

pH

With the assistance of a standard buffer solution, the pH metre was calibrated. It was dissolved in 50.0 mL of distilled water weighing 0.5 gm of cream and its p H was measured using a digital pH meter.

Viscosity

The viscosity of the cream with spindle no. 7 was determined at 100 rpm using a Brookfield viscometer.

Spread Ability Test

The cream sample was applied between the two slides of the glass and was compressed to uniform thickness between the two-glass slide by placing 100 gm of weight for 5 minutes, then adding weight to the weighing pan. As a measure of spreadability the time in which the upper glass slide moved over the lower slide was taken.

$$\text{Spread ability} = m * l / t \quad (1)$$

Where, m =weight tight to upper slide

l =length moved on the glass slide

t =time take

Irritancy Test

Mark an area on the left-hand dorsal surface (1sq.cm). For the defined area, the cream was applied and time was noted. Irritation, erythema, edema, if any, were tested and recorded at regular intervals of up to 24 hours.

Test for Microbial Growth

Agar media are then prepared by streak plate method to inoculate the formulated cream on the agar media of the plate and a controlled cream is prepared by omitting the cream. The plates were put in the incubator and incubated for 24 hours at 37°C. The plates were taken out after the incubation time and the microbial growth was checked and compared with the control.

Saponification Value

Take 2 gm of the substance and reflux it for 30 minutes with 25 ml of 0.5 N alcoholic KOH. Then, as an indicator, add 0.1 mL of phenolphthalein and titrate it with 0.5 N of HCL.

$$\text{Saponification value} = (b-a) * 28.05/W \quad (2)$$

a =volume of titrate

b =volume of titrate

w =weight of substances in gram

Acid Value

Take 10 gm of cream dissolved in a correctly measured mixture of 50 mL of alcohol and solvent ether equal in thickness. Then mount the condenser to the flask and reflux it with the slow heating until the sample is fully dissolved, then add 1 mL of phenolphthalein and titrate it with 0.1 N NaOH until after shaking in 20 seconds, it becomes faint pink colour.

$$\text{Acid value} = n * 5.61/w \quad (3)$$

w =weight of the substances

n =the number of ml in NaOH required.

Dye Test

It incorporates the scarlet red dye with the cream. Place a drop of the cream on a microscopic slide, then cover it and examine it under a microscope with a cover slip. The ground is colourless if the scattered globules appear red. The cream is a kind of o/w. In the w/o style cream, the opposite condition occurs, i.e. the scattered globules appear colourless.

Homogeneity

Homogeneity was tested via the visual appearance and test.

RESULTS AND DISCUSSION

The results of evaluation are shown in Table 2. Prepared formulation was green in colour. It has pleasant odor and smooth texture.

1. Physical Properties:

The physical properties of formulated cream were judged by colour, odour and texture.

2. Washability:

The cream applied on skin was easily removed by washing with tap water.

Table 2: Physical Properties

Sr no.	Parameter	Evaluation
1	Colour	Green
2	Odour	Pleasant
3	Texture	Smooth

3. pH of the Cream:

The pH of the cream was found to be range 5.2 to 6.4, which is good for the pH of the skin. The pH nearer to the appropriate skin, i.e. pH 6.8, was seen in the herbal formulation.

4. Viscosity:

The viscosity of the formulated cream was measured using spindle no. LV-44 by the brook field viscometer at 20 rpm. The cream viscosity ranged from 499990 to 30000cp, which means that the cream is easily spread by small shear amounts. The formulated cream demonstrates the range of viscosity, i.e. 48890cp.

5. Spreadability Test:

The spread ability test showed that the formulated cream has good spreadable property.

6. Irritancy Test:

During studies, the formulated cream exhibits no redness, edema, pain and inflammation. It is healthy to use the formulated cream.

7. Test for Microbial Growth:

After 24 hours of incubation at 37°C, there were no signs of microbial growth and it was comparable to control.

8. Saponification Value:

The results of the saponification value of formulated cream were shown in table no. 3 and the values were satisfactory.

9. Acid Value:

Table 3 showed the acid value results for formulated cream and showed satisfactory values.

Table 3: Saponification Value and Acid value

Sr. No.	Parameter	Evaluation
1	Saponification value	21.5
2	Acid value	5.4

10. Dye Test:

It combines the scarlet red dye with the cream. With a cover slip, place a drop of the cream on a microscopic slide covering it and examine it under a microscope. The scattered globules, i.e. w/o type cream, appear colourless in the red ground.

11. Homogeneity:

Visual appearance and touch measured the homogeneity of the formulated cream. The appearance of the cream and its touch were good.

CONCLUSION

It is concluded from the above results that the formulated cream showed good consistency and spread capacity, homogeneity, pH, non-greasy and no phase separation during the research period of the study. It can be inferred from the above analysis that the polyherbal cold cream is safe to use as it is made from herbal extracts. In the assumption that they are better with less side effects than synthetic ones, natural treatments are more appropriate. Therefore, in the personal care system, the qualities of herbs in the cosmeceutical have been extensively improved and there is a great demand for herbal cosmetics today. It would be highly appropriate to use herbal extracts for a herbal cream that is non-toxic, healthy, efficient and enhances patient compliance than synthetic ones.

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