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FORMULATION AND EVALUATION OF POLYHERBAL FACE CREAM

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ABSTRACT

Usage of more than one herb in a formulation is known as Polyherbal formulation (PHF). In traditional medicine system, phytoconstituents from multiple herbs are mixed in a specific ratio so that they could be used in the treatment of diseases. The concept in selecting polyherbs for formulation development is effective treatment with marginal side effects. Two herbs were taken for the development of formulation of face cream: Portulaca grandiflora and Solanum tuberosum. The Polyherbal formulation was standardized by using various parameters such as organoleptic evaluation, pH determination, Viscosity, Dye Test, Spreadability, Microbial Contamination test and Irritancy test.

KEYWORDS: Polyherbal, Formulation, Face cream, Portulaca grandiflora, Solanum tuberosum, Phytoconstituents

INTRODUCTION

Natural herbs help in preserving and enhancing the beauty and personality of human beings. Natural cosmetic is a general term applied to all preparation used in external conditioning and beautifying the body. Herbal cosmetics are not considered under the preview of drugs and regulations of food and drug administrations. Like cosmetics, these are subjected for their safety according to their existing rules of the different countries.

Portulaca grandiflora and *Solanum tuberosum* are medicinal plants[1]. These plants are used traditionally from ancient year in the various herbal medicinal systems such as Ayurvedic, Homeopathic and Siddha.

Portulaca grandiflora has antibacterial activity[2], antidiabetic activity[3] and antioxidant activity[4]. *Solanum tuberosum* has anti-inflammatory activity[5], antiacne activity[6] and also brightens skin tone. The present research was focussed on the formulation of polyherbal cream and their evaluation by using various evaluation parameters.

MATERIALS AND METHODS

The poly herbal face cream was formulated using two plants, *Portulaca grandiflora* and *Solanum tuberosum*.

Portulaca grandiflora is a succulent flowering plant belonging to the family Portulacaceae, native to southern Brazil, Argentina, Uruguay and often cultivated in gardens. It has many common names, including rose moss, eleven o'clock, Mexican rose, moss rose, sun rose, rock rose, and moss rose purslane[7,8,9].

Table 1: Scientific Classification of *Portulaca grandiflora*

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Order	Caryophyllales
Family	Portulacaceae
Genus	Portulaca
Species	P. grandiflora

Figure 1: Portulaca Grandiflora Plant

Solanum tuberosum is a small plant with large leaves. The part of the potato that people eat is the tuber that grows under the ground. The plant contains a lot of starch and other carbohydrates. It is usually light-brown or yellowish skin and is white or yellow inside. If the plant is exposed to light, the tuber turns green and will be poisonous[10,11].

Table 2: Scientific Classification of *Solanum tuberosum*

Kingdom	**Plantae**
Clade	Tracheophytes
Clade	Angiosperms
Clade	Asterids
Order	Solanales
Family	Solanaceae
Genus	Solanum
Species	*S. tuberosum*

Plant Authentication

The steps involved in authentication are taxonomic, macroscopic and microscopic studies. Records were maintained for stage of collection, parts of the plant collected, regional status, and botanical identity such as

Figure 2: Solanum Tuberosum

phytomorphology, microscopical, histological analysis, and taxonomical identity. The authentication of the plant was obtained from Tamil Nadu Agricultural University, Coimbatore.

Collection of Plant Material

These medicinal plants were collected during the appropriate season or time period to ensure the best possible quality of formulation. Plants were collected in proper manner at nearby locality. Mainly two plants are involved in the formulation. The whole plant of *Portulaca grandiflora* was used for this formulation like Buds, Flowers, Leaves, Stems, and Roots because of its rich phytoconstituents and tubers of *Solanum tuberosum* were also collected. During the collection process some parts of the plants were in direct contact with soil such as root. These underground parts should be free from soil. The plants collected by hands. Collected plants were placed in clean baskets.

Drying

The drying process has been used for thousands of years to reduce the transport weight and to increase the storage life of numerous products and materials. With the dawn of the industrial age, many drying processes have been developed to increase the drying speed and improve the product quality and uniformity. In this study, the plant material were shade dried, as direct drying under sun light, sometimes leads to loss of phytoconstituents and color of the material.

Extraction

It is the treatment of plant with solvent where by the medicinally active constituents are dissolved and most of the inert matter remains undisclosed. Two plants used for this formulation were extracted using different extraction technique.

Portulaca grandiflora plant was extracted by using Soxhlet apparatus.

The powdered drug was placed inside a thimble made from thick filter paper, which is loaded into the main chamber of the Soxhlet extractor. The Soxhlet extractor was placed onto the flask containing the extraction solvent ethanol. The Soxhlet was then equipped with condenser. The solvent vapor travels up a distillation arm and floods into the chamber housing the thimble of solid. The chamber containing the solid material slowly was filled with warm solvent. When the Soxhlet chamber was almost fill, the chamber was automatically emptied by a siphon arm with the solvent running back to the distillation flask. This cycle was allowed to repeat for many times. After many cycles, the desired compound was concentrated into the distillation flask. This procedure was taken continued up to 48 hours to get a concentrated *Portulaca grandiflora* extract.

Figure 3: Extraction Process of *Portulaca grandiflora*

Solanum tuberosum was extracted using Maceration technique. The tubers of the plant were washed by rinsing with water to remove the soil and other foreign materials. Then the tubers were cut into small pieces and soaked in a beaker containing distilled water. It was allowed to stand for a period of 3-7 days with frequent agitation to get the extract.

Formulation of Polyherbal Face Cream

The polyherbal face cream was formulated by using following ingredients.

Stearic Acid

It is an emulsifier and it act as an emollient, lubricant which softens skin.

Cetyl Alcohol

It is an emulsifier which helps to prevent creams from separating into oil and liquid.

Almond Oil

Almond oil is extremely nourishing oil rich in Vitamin A and E. It nourishes the skin and improves the overall complexion and helps in reviving the natural glow. It is also useful for lightening dark circles, dark spots and marks. It is also suitable for delicate irritated and sensitive skin types.

Triethanolamine

It mainly acts as a preservative and is used to balance the pH level.

Starch Extract

It is used to improve the moisturisation of skin.

Formulation

A clean and dried mortar and pestle was taken. Two clean beakers were taken and mentioned as A and B. In beaker A, oil phase of stearic acid, cetyl alcohol, and almond oil were added. In beaker B, water phase of triethanolamine as a preservative and *Solanum tuberosum* extract was added. The contents were heated on a water bath until it reaches 75 degree Celsius. Both the beakers A and B were placed in a water bath until it gets dissolved. When all ingredients get completely dissolved, aqueous phase was added to the oil phase with constant stirring. Then the water and oil phase compound was transferred to the mortar. Using 1ml syringe, the *Portulaca grandiflora extract* was added drop by drop to the mortar. The mixture was triturated using pestle until the formulation gets a cream consistency with the clicking sound. Finally the polyherbal face cream was transferred to a neatly labeled clean cream container.

Evaluation of Physicochemical Parameters of the Formulation

Appearance

The appearance of the cream was judged by its color, opalescence, and roughness and graded.

Homogeneity

The formulations were tested for the homogeneity by visual appearance and by touch.

pH

About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

Viscosity

Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no.7.

Dye Test

In this test, the emulsion was mixed with a water soluble dye, amaranth and observed under the microscope. If the continuous phase appears red then it means that the emulsion is O/W type. If the scattered globules appear red and continuous phase colorless then it is W/O type.

Spreadability

The formulations were tested for spreadability using hands. Small amount of formulation was taken and applied on the hand to ensure the spreadability of the cream.

Microbial Contamination Test

This test was done by pour-plate technique. The bacterial culture and liquid agar medium was mixed together. After mixing the medium, the medium containing the culture was poured into sterilized petridishes, allowed to solidify and then incubated. After incubation colonies appear on the surface.

Irritancy

The bases used in the formulation of cream were tested for any irritation or allergic reactions. Irritancy of the preparation was evaluated by patch test. An area of 1sq.cm was marked on the dorsal surface of the hand. The cream was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hours and reported.

RESULTS AND DISCUSSION

Dye Test

Prepared cream was found to be O/W emulsion because it

Figure 4: Dye Test of the Formulation

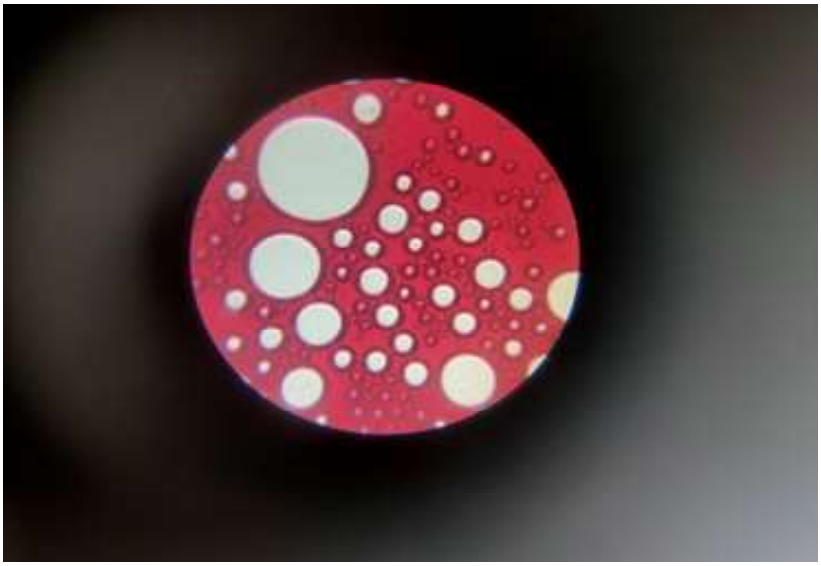

Figure 5: Appearance of the Formulation

shows that the background is coloured and the globules are colorless. Cream has good spreadability and penetration on application on the skin. Furthermore, this cream may spread and permeate easily.

Appearance

Prepared creams were pale greenish in colour with good looking elegant appearance.

Homogeneity

Prepared cream was homogenous. No aggregates were present in the formulation.

pH

pH of the prepared creams was in the range of 6-7. It shows that obtained pH is near to skin pH and it does not cause any skin irritation.

Viscosity

Viscosity of the formulation was determined using Brookfield Viscometer. Observed viscosity was in the range of 2020-2060 cps.

Irritation

It was done by application of the formulation on the hand

and was observed that the cream formulation doesn't produce any irritation.

Spreadability

It was also done by application of the formulation on the hand and the cream formulation was observed to have good spreadability, when applied over the skin.

Microbial Contamination

It was done by using pour-plate technique to ensure the cream formulation free from contamination and foreign bodies.

CONCLUSION

Formulations in which multiple extracts of plants are converted into a single dosage form to show synergistic effects are called Polyherbal formulations. A polyherbal face cream containing extracts of *Portulaca grandiflora* and *Solanum tuberosum* were developed and evaluated. The herbal face cream successfully developed was found to meet the relevant pharmaceutical characteristics form. The developed herbal cream is a potential candidate for conducting further clinical studies.

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