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Characterisation and formulation of skin cream from seed oil extracted from *Cucumis melo*

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ABSTRACT

The present work was aimed to characterize and formulate skin cream using seed oil extracted from *Cucurbita pepo*. Extraction of oil from *Cucurbita pepo* was done by soxhlet using n-hexane. The seed oil had an amber colour and a very characteristic nutty flavour. The percentage oil contents from the dried powdered seeds of were 31.30%. The physiochemical analysis of seed oils showed that both oils are semi drying and could be used in production of skin cream. The stability studies were carried out by storing at different temperature conditions like $30 \pm 2^\circ\text{C}$ / $65 \pm 5\%$ RH and $40 \pm 2^\circ\text{C}$ / $75 \pm 5\%$ RH for two months. During the stability studies no change in colour and no phase separation were Antimicrobial studies indicated that both formulations inhibited the growth of microorganism. The skin cream formulated from seed oil compared favorably with commercial products.

Keyword: *Cucurbita pepo*, seed oil, physiochemical analysis, skin cream

INTRODUCTION

Skin aging is the result of continual deterioration process because of damage of cellular DNA and protein. Aging process is classified into two distinct, i.e. "sequential skin aging" and "photo-aging". Both types have distinct clinical and historical features .skin aging is universal and predictable process characterized by physiological alteration in skin function [1]. Cosmetic products are used to protect skin against exogenous and endogenous harmful agents and enhance the beauty and attractiveness of skin. The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders.. The synthetic or natural ingredients present in skin care formulation that supports the health, texture and integrity of skin, moisturizing, maintaining elasticity of skin by reduction of type I collagen and photo protection etc [2].

An herbal cosmetic have growing demand in the world market and is an invaluable gift of nature. Herbal formulations always have attracted considerable attention because of their good activity and comparatively lesser or nil side effects with synthetic drugs. Herbal cosmetics are defined as the beauty products which posses desirable physiological activity such as healing, smoothing appearance, enhancing and conditioning properties because of herbal ingredient [3].

Cucurbita pepo is a perennial creeping herb of Gourd family Cucurbitaceae. The fruit of form and size variables contains a fibrous pulp containing largely of many oval seeds. Seeds of *C. pepo* have long been used as a remedy for various ailments like diuretics, antihelmentic, anti-inflammatory, anticancer [4-6]. Pumpkin seed oil has an intense nutty taste and is rich in polyunsaturated fatty acids. Pumpkin seed oil is used for salads as a dressing, for desserts,

giving ordinary vanilla ice cream an exquisite nutty taste. It is considered a real delicacy in many countries and few drops are added to pumpkin soup and other local plates. Using it as cooking oil, however, destroys its essential fatty acids. Benign prostatic hyperplasia can be treated by pumpkin oil which is reported in the folk medicine. The oil is most commonly used to treat irritable bowel syndrome. Some studies have found pumpkin seeds to prevent arteriosclerosis and regulate cholesterol levels. Pumpkin seed oil, commonly prescribed in German folk medicine, remedies parasitic infestations of the intestinal tract such as tapeworms [7].

Present work reports the extraction, characterization and formulation of skin cream of *Cucurbita pepo* seed oils.

MATERIALS AND METHODS

Plant Collection:

Seeds of *C. pepo* were collected from the residential areas of Kasegaon. These seeds were sundried for 4-5 days and then reduced to powder form in a mortar.

Preparation of Plant Extract:

The dried seeds were powdered and passed through sieve no. 44 and the fine powder (100gm) was extracted by soxhlet extraction using n-hexane (600ml) as a solvent for 24hours. The extract was filtered and solvent was evaporated to obtain oil of *C. pepo* seeds.

Phytochemical Screening of seed Oil:

Phytochemical screening tests of *C. pepo* oil were performed according to the standard procedure from literature [8].

Physico-chemical characteristics of seed oil:

The oil sample was subjected to the ordinary oil constants, e.g. acid value, iodine, saponification and specific gravity and the refractive index were estimated according to the standard procedures [9].

Formulation of Skin Cream

C. pepo oil (4.76 g) was mixed with 2 g emulsifying wax, 1 g Stearic acid and 0.7 g Cetyl alcohol. The mixture was melted at 70°C and a mixture of 15 ml water, 1.7 g glycerine and 5 g Sodium stearate was added with continuous stirring. 0.8 g Sodium benzoate, 0.2 g methyl paraben and 0.5ml Propylene glycol were added to the mixture with stirring (Table 1).

Table 1. Formulation of Herbal skin cream

Sr. No.	Ingredients	Quantity
1.	<i>C. pepo</i> seed Oil	4.76 g
2.	Emulsifying wax	2 g
3.	Stearic acid	1 g
4.	Cetyl alcohol	0.7 g
5.	Glycerin	1.7 g
6.	Sodium Stearate	5 g
7.	Sodium benzoate	0.8 g
8.	Methyl Paraben	0.2 g
9.	Propylene glycol	5 ml

Physical Evaluation of Skin Cream [9-11]

1)Physical Properties: The Cream was observed for color, odour and appearance.

2)Test for Thermal Stability: Thermal stability of the formulation was determined by the humidity chamber controlled at 60- 70% RH and 37 ± 1°C.

3)Determination of pH: 5 ± 0.01g of the Cream was weighed accurately in a 100 ml beaker. 45ml of water was added & dispersed the Cream in it. The pH of the suspension was determined at 27°C using the pH meter.

4)Stability studies: Stability testing of drug products begins as a part of drug discovery and ends with the demise of the compound or commercial product. To assess the drug and formulation stability, stability studies were done according to ICH guidelines. The stability studies were carried out as per ICH guidelines. The cream filled in bottle and kept in humidity chamber maintained at 30 ± 2°C / 65 ± 5 % RH and 40 ± 2°C / 75 ± 5 % RH for two months. At the end of studies, samples were analyzed for the physical properties and viscosity.

5) Patch Test: About 1-3gm of material to be tested was placed on a piece of fabric or funnel and applied to the sensitive part of the skin e.g. skin behind ears. The cosmetic to be tested was applied to an area of 1sq.m. of the skin. Control patches were also applied. The site of patch is inspected after 24 hrs. .

Anti Microbial Studies

The screening of anti-microbial efficacy of the formulated skin cream was performed on various micro organisms by using Dip well method as per standard procedure [9]. Three sterile petri plates were taken for testing the anti microbial activity against three different microorganisms' i.e gram +ve bacteria (*S. aureus*), gram –ve bacteria (*E. coli*) and a *P. Aerogenosa*.

RESULTS AND DISCUSSION

Phytochemical screening:

The seed extract showed the presence of glycosides and fixed oils.

1. Solubility: soluble in ether, chloroform and benzene.
2. Filter paper gets permanently stained with oil.
3. Osmic acid test: oil globules appear black under microscope.

Physiochemical characterization:

The seed oil had an amber colour and a very characteristic nutty flavour. The oil was also stable at the room temperature. The physical and chemical characteristic of the seed oil are summarised in Table 1. The table 2 clearly shows that the iodine and saponification values are especially high. The specific gravity and refractive index of the oil are also relatively high. The physical characteristic results from the oil indicated that the properties of the seed oil are similar to oils rich in linoleic acid. The Free fatty acid and acid values of both oils indicated that they would require purification, but could be used for precipitation of fatty acids from the oils. The high iodine values placed them as semi drying oils and could be used for preparation of skin cream [12].

Table 2: Physiochemical characterization of *C. pepo* seed oil

Determinations	Results
Oil content (%)	32.64
Specific gravity (20°C)	0.935
Refractive index	1.4695
Free fatty acid (mg/g)	22.50
Acid value (mg/g)	2.32
Saponification value (mg/g)	180.33
Iodine value (mg/100g)	148

Physical Evaluation of Skin Cream

The pH of the prepared cream with the extract was found to be 5 which is suitable for topical application because the pH of the skin is between 5-6. The results of Physical Properties are summarized in table 3. The results of Thermal Stability and pH of cream are summarized in table 4. The stability studies of the various parameters like visual appearance, nature, pH of the formulations showed that there was no significant variation after two months of the study period and the results are summarized in table 5. The formulation shows no redness, edema, inflammation and irritation during Patch Test studies. These formulations are safe to use for skin.

Table 3: Physical Properties of cream

Sr. No	Test	Observation
1	Color	white
2	Odour	Characteristic
3	Appearance	Semi- solid

Table 4: Thermal Stability and pH of cream

Sr. No	Test	Observation
1	Thermal Stability	Stable, no oil separation
2	pH	5.62

Table 5: Stability studies of cream

TESTS	30 ± 2°C / 65 ± 5 % RH and			40 ± 2°C / 75 ± 5 % RH		
	Initial month	After – 1 month	After – 2 month	Initial month	After – 1 month	After – 2 month
Physical appearance	Semi-solid	Semi-solid	Semi-solid	Semi-solid	Semi-solid	Semi-solid
Texture	Fine	Fine	Fine	Fine	Fine	Fine
Colour	White	White	White	White	White	White
Odour	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic	Characteristic
pH	5.8	5.9	5.9	5.5	5.5	5.8

The formulated creams were tested for the presence of pathogenic microorganisms by culturing it with agar medium. There were no signs of microbial growth after incubation period of 24 hours at 37⁰ C and having significant antimicrobial property. Thus, antimicrobial studies indicated that the formulation inhibited the growth of microorganism (Table 6).

Table 6: Antimicrobial activity of skin cream

	Zone of Inhibition		
	<i>E.coli</i>	<i>S.aureus</i>	<i>P.aerogenosa</i>
Skin cream	20.00±0.00	18.00±0.00	17.00±0.5

CONCLUSION

From the study, it was concluded that seed oil was found to contain fatty acids. The oil showed a significant application in skin cream. Thus, there is immense potential in establishing the use of *C. melo* seed oil for further development of commercial products.

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