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# Formulation and Evaluation of Poly-Herbal Cosmetic Cream of *Cyperus rotundus*

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**ABSTRACT**
*In this study, an herbal face cream including extracts of Cyperus rotundus, Azadirachta indica, and citrus aurantium sinensis, members of the Rutaceae family, as well as almond oil, was created and evaluated. The ethanol extract of Cyperus rotundus (roots), Azadirachta indica (leaf), also known as neem or margosa, a fast-growing tree valued for its medicinal properties, as a source of organic pesticides, and for its timber, along with almond oil in varying concentrations, were used to create the different types of formulations for oil in water (O/W) herbal creams, namely F1 to F6. Irritation was tested in all six formulations (F1–F6), as well as several other parameters such as pH, viscosity, spreadability, rheological studies, and stability. Phase separation was not visible, and the F3 and F4 formulations displayed good homogeneity, appearance, pH, spreadability, and ease of removal. The formulations F4 and F5 did not cause any redness, edema, inflammation, or irritation during the irritancy tests. The skin can be safely used with this formulation.*
***Key words:*** *Cyperus rotundus, Azadirachta indica, Citrus aurantium sinensis, Almond oil, Herbal formulation.*

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## INTRODUCTION

The demand for skin care products is steadily expanding. The accessibility of unique ingredients, economic assistance for developing cost-effective ingredients, consumer demands, and a greater understanding of dermal physiology are all contributing factors to this expansion. Cosmetics are items that are designed to be applied to the body in order to wash, beautify, or otherwise change appearance and boost beauty. Cosmetics are intended to diminish wrinkles, cure skin problems, and regulate oil production. Formulations for different skin conditions, including as skin protection, sunscreen, anti-acne, anti-wrinkle, and anti-aging, are created utilising a variety of materials, both natural and manufactured. The maintenance of quality standards is necessary throughout the development of cosmetic formulation. In terms of performance, a formulation's quality should meet consumer demand and components of the plant (1-4).
A review of the literature revealed that the Neem tree is beneficial and is regarded as one of the best medicinal trees. It is possible to use neem as an antiseptic. It eliminates dandruff. It's used to treat skin issues. It cleanses the blood and helps to control diabetes. Eliminates intestinal worms it eliminates head lice. Neem leaves are used to treat leprosy. It was once used to treat acne. Citrus sinenesis has the following properties: From fading dark spots to vanishing tan lines, this product improves texture, removes unwanted tan lines, acts as a gentle exfoliator, and has anti-aging properties. Almonds (Prunus Amygdalus) are a natural product high in polyphenols, particularly flavanones and phenolics. Almond oil contains emollients, which help the skin maintain moisture loss and humidity absorption (5-7)

## MATERIAL AND METHODS

**Plant Material:** The information for the suggested *Cyperus rotundus* research came from a local field in Narsapur. Healthy rhizomes have been chosen carefully. *Azadirachta indica* was gathered here on campus of our college and *citrus sinensis* (outer peel).

***Fig no: 1 Cyperus rotundus* (root)**

***Fig no: 2 Azadirachta indica* (leaves)**

***Fig no: 3 citrus sinensis* (outer peel)**

**Extract preparation**: The Clevenger apparatus was utilized to hydro distilled 500 gm of *Cyperus rotundus* (root), *Azadirachta indica* (leaves) in powdered form and *citrus sinensis* (outer peel) for 6-7 hours. The oil was extracted from an aqueous distillate with diethyl ether, dried over anhydrous $Na_2SO_4$, and then evaporated at room temperature. In parallel, the air-dried tubers (200gm) were powdered and cold macerated with 85% ethanol until exhaustion. A dark residue was obtained after the ethanol extract was evaporated using a rotary evaporator (5gm)

***Fig no: 4 Cyprus rotundus rhizomes for Drying***

***Fig no: 5*** **Solubility Studies**

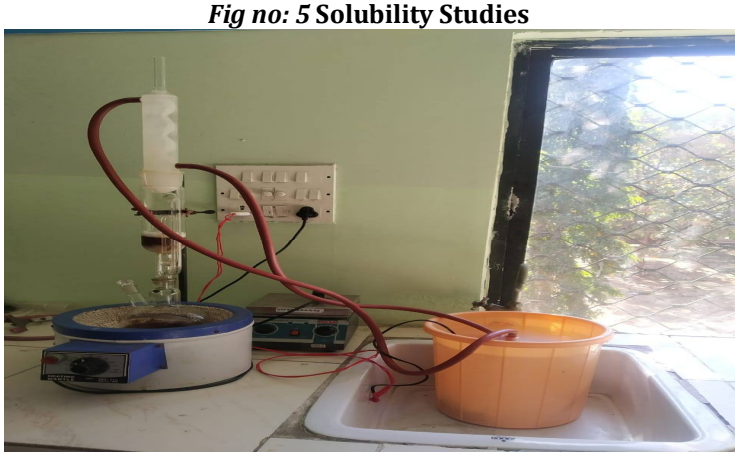

***Fig no: 6 Cyperus Rotundus*** **Extraction by Using Ethanol as Solvent**

**Drug formulation:** An oil-in-water (O/W) emulsion-based cream was created (semi-solid formulation). In the oil phase (Part A), the substance (salicylic acid) and other oil soluble constituents (almond oil, cetyl alcohol) have been diluted as well as heated to 83 °C. In the aqueous phase, preservatives and also other water-soluble materials (Methyl paraben, Propyl paraben, Triethanolamine, glycerine), ethanol extracts of Cyperus rotundus and Azadirachta, and Citrus sinenesis have been heated to 83 °C (Part B). Having followed warming, the aqueous layer has been added gradually to the oil phase while continuously stirring till it emulsifier cooled. Table 1 illustrates the cream's formula.

**Evaluation of cream**

**Appearance:** Colour, pearlescence, and roughness were all used to grade the cream's appearance.

**After feel**: The emolliency, slickness, and quantity of residue left after applying a fixed amount of cream were all evaluated.

**Removal:** The cream's ease of removal has been evaluated by washing the levied part with water from the tap.

**Type of smear:** The type of film and smear which founded just on skin only after cream was applied was studied

**Irritancy test:** Contemplate a 1 square cm mark on the dorsum of the left hand. The best cream has been supposed to be applied to the designated place, as well as the time was tracked. For up to 24 hours, irritation, skin redness, and inflammation have been recorded and reported on a routine basis.

**Dye test:** Cream is blended with dye that is scarlet red. On a microscopic slide, a portion of the cream is applied before being covered with a glass slide and viewed via a microscope. If the scattered globules are crimson, the ground is colourless. The type of cream is called o/w. The distributed globules in the red ground of the w/o type cream resemble white**.**

**Viscosity:** The formulation's viscosity was determined using a Brookfield Viscometer at 100 rpm and spin no 7.

**pH of the Cream:** The pH metre used only a standard buffer solution to calibrate. The pH of a cream has been ascertained after measuring 0.5g of cream and dissolving it in 50.0 ml of distilled water.

**Acid value:** After accurately assessing and diluting 10 g of material in 50 ml of an equal mixture of ether and alcohol, one 1ml of phenolphthalein was incorporated and ascertained by titration with 0.1N NaOH until a dimly pink colour showed up after shaking the flask for 30 seconds. After that, the flask was connected to a reflux condenser and gradually heated until the sample was completely dissolved.

Acid value: n * 5.61 / w

n is the quantity of ml of NaOH needed.

w is the substance's weight**.**

**Saponification value:** Introduce approximately 2 gm of the material should be added after it has been refluxed for 30 minutes with 25 ml of 0.5 N alcoholic KOH, 1 ml of phenolphthalein, and 0.5 N HCL.

Saponification value = (b-a) * 28.05/w

The volume in ml of titrant = a
The volume in ml of titrant =b
The weight of substance in gm = w
**Homogeneity:** The homogeneity of the formulations was tested visually and by touch.

**Rheological studies:** It was found that the cream's composition was not Newtonian. Take 10 gm of cream and put it in a 10 ml beaker. For an hour, keeps the impact going. To determine if the cream had liquefied or not, the beaker was tipped to one side. To check if the consistency has altered, the beaker is shaken back and forth repeatedly for five minutes. Once more, the beaker was inverted to examine the cream's pourability.
**Accelerated stability testing:** The two most stable formulations underwent accelerated stability testing over a seven-day period at room temperature. They were formulas 4 and 5, and they were stored for 20 days at 40 °C ± 1 °C. The essential parameters were recorded on the first, fifth, tenth, fifteenth, and twentieth days while the formulations were held at room temperature and at increased temperatures [8-9].

**Results**
**Appearance:** Long-term storage of formulations revealed no change in the cream's colour.
**After feel:** We discovered emolliency, slickness, and the amount of residue left but upon applying a predetermined amount of cream.
**Removal:** The skin cream could be readily washed away by washing with regular tap water**.**
**Type of smear:** The type of smear that appeared on the skin after using the cream is non-greasy**.**
**Irritancy test:** During irritancy testing, the formulations F3 and F4 don't cause redness, edoema, inflammation, or irritation. These formulas are suitable for skin usage (Table 4).
**Dye test:** This dye demonstrates that all compositions included the cream o/w kind. But in an o/w type emulsion, formulation (F4) appears to be more stable**.**
**Viscosity:** The cream's viscosity, which ranged from 27016 to 27035 cps, shows that it can be easily spread with only a little shear. But compared to other formulations, F3 and F4 demonstrate better dispersibility.
**pH of the Cream:** The cream's pH was discovered to be between 6 and 7, which is a good pH for skin. Every formulation was proven to need a pH that is closer to skin (Table 2).
**Acid value and Saponification value:** The findings of the acidity and saponification of each formulation were shown in Table 3 and were acceptable (Table 3).
**Homogeneity:** All formulations result in an even dispersion of extracts throughout cream. This was verified by both touch and visual appearance.
**Rheological studies**: It was determined via research on the cream's rheological characteristics that it exhibited pseudo plastic flow characteristics. There were no thixotropic (shear thinning) properties in any of the formulations.
**DETERMINATION OF ACUTE ORAL TOXICITY:** According to OECD 423 recommendations, the study of acute toxicity was conducted using the acute toxic class, category IV substance technique. In this investigation, 3 albino rats (of either sex), randomly selected (n=3), were used. The animals were kept up for 4 hrs without food and were only allowed free access to water. The *Cyperus Rotundus* plant extract was administered orally at a maximum dose of 2 g/kg b.w. Within three days, the death was noticed. If 2/3 or 3/3 of the rat animals died, the dose being administered is regarded as hazardous. However, the same dose was repeated once again to confirm the harmful impact if just one death was seen in three rats. If no sign of mortality appeared, the process was repeated using a higher dose (Table:5).

**DISCUSSION**
*Cyperus rotundus*, *Azadirachta indica* and *Citrus sinensis* are well known in Indian traditional medicine and ayurvedic preparations for their medicinal value. In this operation, it was determined to extract and create a herbal face cream. Customer compliance improved since the herbal face cream was an O/W emulsion and also was simple to remove with just water. On the global market, there is a huge need for herbal cosmetics and they are priceless natural gifts. As a result, we attempted to create an herbal face cream with Cyperus

rotundus extract, *Azadirachta indica*, and *Citrus sinensis* in various concentrations, as well as almond oil. According to our findings, formulations F3 and F4 were compared with other formulations, was discovered to be more stable.

**Table 1: Herbal Formulation**

| S.No | Ingredients | Formula % w/w | | | | | |
|---|---|---|---|---|---|---|---|
| | | F1 | F2 | F3 | F4 | F5 | F6 |
| 1 | Ethanol extract of Cyperus Rotundus | 2 | 1.5 | 2 | 1.5 | 1 | 2.5 |
| 2 | Ethanol extract of Neem leaf | 0.5 | 2 | 1 | 2 | 1.5 | 2.5 |
| 3 | Ethanol Orange peel extract | 1 | 1.5 | 2 | 1 | 2 | 0.5 |
| 4 | Salicylic acid | 7 | 5 | 6 | 4 | 5.5 | 6 |
| 5 | white bees wax | _ | 1.5 | 2 | 3 | 2.5 | 2 |
| 6 | Triethanolamine | 1.5 | 2 | _ | 1 | 2 | 2 |
| 7 | Almond oil | 6 | 3 | 4 | 5 | 4.5 | 6 |
| 8 | Glycerine | 4 | 4 | 4 | 4 | 4 | 4 |
| 9 | Methyl paraben | 0.1 | 0.5 | 0.1 | 0.1 | 0.2 | 0.5 |
| 10 | Propyl paraben | 0.2 | 0.1 | 0.5 | 0.2 | 0.1 | 0.2 |
| 11 | Cetyl alchol | 5 | 4 | 4 | 4 | 5 | 4 |
| 12 | Water | q.s | q.s | q.s | q.s | q.s | q.s |

**Table 2: pH of formulations**

| S.No | Formulation | pH |
|---|---|---|
| 1 | F1 | 6.9 |
| 2 | F2 | 6.5 |
| 3 | F3 | 6.6 |
| 4 | F4 | 6.4 |
| 5 | F5 | 6.5 |
| 6 | F6 | 6.8 |

**Table 3: Acid value and saponification value tests were conducted.**

| S.NO | Parameter | Formula | | | | | |
|---|---|---|---|---|---|---|---|
| | | F1 | F2 | F3 | F4 | F5 | F6 |
| 1 | Acid value | 5.7 | 5.6 | 5.8 | 5.7 | 5.9 | 6.1 |
| 2 | Saponification value | 26.3 | 26.2 | 27.3 | 25.3 | 26.3 | 27.2 |

**Table 4: Type of Adverse effect of formulation**

| S.No | Formulation | Irritant | Erythema | Edema |
|---|---|---|---|---|
| 1 | F1 | NIL | NIL | NIL |
| 2 | F2 | NIL | NIL | NIL |
| 3 | F3 | NIL | NIL | NIL |
| 4 | F4 | NIL | NIL | NIL |
| 5 | F5 | NIL | NIL | NIL |
| 6 | F6 | NIL | NIL | NIL |

**Acute Oral Toxicity of 80% EOP:**

The *Cyperus rotundus* medicinal plant extract showed no signs of toxicity or mortality. Even when the highest dose of 2 g/kg b.w. was used.

Sheet of Toxicity record: Sheet of Toxicity record is as follows:

**Table No. 5: Acute Oral Toxicity of 80% EOP**

| S.No | Code | Toxicity | | Time of Dose | Observation | | | |
|---|---|---|---|---|---|---|---|---|
| | | Onset | Stop | | Skin Colour | Respiratory | CNS | Diarrhea |
| 1. | EOP | X | X | X | X | X | X | X |

X = Negative, Ø = Positive

## CONCLUSION

The concept of poly herbs are effective medicinal agents is now being explored in both clinical and experimental settings. Even large pharmaceutical companies that make poly botanical formulations are increasingly focusing on this idea. This development resulted from the medicinal qualities that each herb has that are diverse. This is how Nut grass Experimental evidence supports the anti-oxidant, anti-inflammatory, anti-malarial, hepato-protective, anti-obesity, and anti-convulsant qualities of (Cyperus rotundus). The moment is right Must continue researching this plant in order to further understand its remarkable healing powers for the benefit of mankind.

## REFERENCES


1. Anurag Rajvanshi, Shalini Sharma, Sukhbir Lal Khokra, Ram Kumar Sahu, Rajendra Jangde. Formulation and evaluation of Cyperus rotundus and Cucumis sativus based herbal face cream. *Pharmacologyonline* 2: 1238-1244 (2011).
2. Dureja H, Kaushik D, Gupta M, Kumar V, Lather V. Cosmeceuticals: An emerging concept. Indian Journal of Pharmacology 2005; 37(3): 155-159.
3. Rashmi MS. Topical gel: A review. Pharm Rev 2008; 6: 1–3.
4. Choudhuri, RK. Emblica cascading antioxidants: Novel natural skin care ingredients. Skin Pharmacol. Applied Skin Physiol 2002; 15: 374-380.
5. Karthiyayini *et al.* Evaluation of antidiabetic and hypolipidemic effect of *Cucumis sativus* fruit in streptozotocininduced- diabetic rats. Biomedical and Pharmacological Journal 2009; 2(2): 351- 355.
6. Touche A *et al.* Administration of *Cyperus rotundus* tubers extract prevents weight gain in obese Zucker rats. Phytotherapy Research 2007; 21(8): 724-30.
7. Grimm W. Extension of The International Conference on Harmonization Tripartite Guideline for Stability Testing of New Drug Substances and Products to Countries of Climatic Zones III and IV. Drug Development and Industrial Pharmacy 1998; 24(4): 313- 325.
8. http://www.cosmeticsinfo.org/ingredient_details.php.
9. Forster *et al.* Influence of Micro-emulsion Phases on The Preparation of Fine Disperse Emulsions. Adv. In Colloid & Interface Sci. 1995; 58:119-149.



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