

## Formulation of Marigold Face-wash and its efficacy comparison with Coconut and Basil Oil

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### Abstract

In India, every year 8 tons of floral waste is disposed to rivers and water bodies, polluting them to huge amount. If this floral waste is used technically, the amount of waste can be reduced to a huge content. These flowers can be widely used in preparation of cosmetics products. This study identifies the use of marigold waste to prepare face pack. The marigold floral waste is tested with two different oils and is compared with the efficacy. Face pack made with coconut oil is compared to face pack made with basil oil. The final product is tested with different pharmaceutical tests and results are compared. pH, stability test, ash content and residue on evaporation tests are being done for the product. After the test result comparison it is found that marigold face pack prepared with basil oil is more efficient as compared to coconut oil.

**Keywords:** Marigold waste, turmeric powder, pH, stability, Ash content,

### I. INTRODUCTION

Marigolds were first discovered by the Portuguese in Central America in the 16th century. Then they introduced these flowers to Europe and India. Historically speaking, everyone from the Greeks, Romans, Indians, and Arabs used this plant as a medicinal herb, dye, and cooking ingredient.

The golden yellowish color of marigolds reflects the color of the Arya era. Marigold is one of the traditional flowers used in garlands and offerings in Maharashtra during the Navratri to Diwali period. Due to more availability of water, marigolds are cultivated in large production in Nashik District. Nashik is the main hub for the marigold market due to high available rates and easy transportation modes available to other big cities. Marigolds are also widely used in all kinds of rites and rituals.

The petals, pollen, and stems are rich in triterpenoid esters (an anti-inflammatory), antioxidants, and carotenoids, giving the flower a wide array of functions. As of today, marigold products are used as a bactericide, antiseptic, antiviral, and anti-inflammatory to treat various skin disorders and pain.

In cosmetics, it's mainly used in the form of an oil extract as a skin conditioning agent, anti-inflammatory, wound healing agent, and fragrance additive. The flavonoids and saponins contained in extracts of the plant have been shown to not only promote skin healing and repair but also significantly reduce inflammations. It also possesses strong vulnerary properties (inhibiting tissue degeneration and stopping the bleeding in wounds), making it an excellent treatment for bruises, sores, ulcers, wounds, rashes, eczema, etc.

### II. Literature Review

**Priyanka Tiwari et.al** in their study presented a successful attempt to convert flower waste into vermicompost. The flower waste was mixed with cattle dung to make it suitable for the culture of selected earthworms. To enhance the degradation of cellulosic material of flower waste, experiments were conducted to demonstrate the effect of mixing of *Trichoderma harzianum* powder. It was concluded that the flower waste can be managed through vermicomposting.

**Kanika Dhote et.al.** presented the study to prepare and evaluate the herbal cosmetic cream comprising extracts of *Calendula Officinalis* the formulation, therefore, was found to be safe to use for skin. The study suggests that the composition of extracts and base of cream are more stable and safe, it may produce synergistic action.

**Andrea Plackova et.al** The antioxidant capacity in Bulgarian marigold flowers was determined by higher levels of flavonoids, catalase, ascorbate peroxidase, glutathione-S-transferase a dehydroascorbate reductase. Marigold grown in Slovakia had higher dry biomass of flower heads with a higher carotenoid content. Different soil-

climatic conditions mobilize different compounds of the antioxidant defense system and accumulate biomass and carotenoids in marigold plants grown in both countries.

**Aakanksha Mahindrakar** presented that floral waste can be utilized in different ways to produce valuable products and can thus help to save the environment from pollution caused due to improper disposal of flower waste. Techniques like vermin-composting, dyes extraction, extraction of essential oils, making of Holi colors and bio-gas generation can be used.

### **III. Methodology**

The floral offerings offered during Durga festival to Diwali festival was collected from the temples of Nasik city. This season is most suitable for obtaining these types of flowers. The obtained floral waste was then segregated according to the species, family, and color of the flowers. Out of which the marigold floral waste was selected for further use. The segregated flowers were then peeled into petals and allowed to dry at room temperature for 3 to 4 days. After the complete drying of petals, they were pulverized into a coarse powder for further cosmetic use. These dried petals were used as the main excipient i.e. active for making face packs.



**Fig. 1:** Collection and Segregation of Marigold flowers.

#### **a. Other excipients used for face pack**

The other excipients viz. turmeric powder, vekhand powder, black cumin powder, fuller's earth, coconut oil, basil oil, etc were used to make face-pack. The process includes the addition of a pinch of turmeric powder to a test tube. Add few drops of water and conc. HCl to it. Shake the test tube vigorously till the color changes to pink. This color shows the presence of metanil yellow and can be used for preparation of face-pack. The vekhand powder (calamus root) was taken in a separate bowl. This is the best alternative to chemical removers. The black cumin powder (*Nigella sativa*) was checked for testing alkaloids saturated solution of picric acid. To check this content filtrate was added to it. This is most important test to decide its use for the preparation of cosmetic products. If the color changes to yellow color precipitate, then it is suitable for cosmetics use. The next test was done for checking tannins.

A 5% solution of ferric chloride was prepared and added to black cumin powder (*Nigella sativa*) filtrate. If the color changes to green then it's suitable for cosmetics use. The test was performed and it was found that the black cumin powder is suitable for cosmetics preparation.

Multani mitti is rich in magnesium chloride. It gives a glowing effect to the skin as they contain healthy nutrients. 5gms of powder was taken in a bowl. It is known to fight acne and pimples.

Coconut oil was poured into a transparent test tube. The test tube was placed in a refrigerator for 30 minutes to solidify. The crushed marigold petals were kept for maceration with coconut oil for 7 days and then the oil was tested for its absorbance at various wavelengths.

This coconut oil is then used for face pack formulation with different percentages and as well as crushed marigold petals were also used at different percentages to obtain the best product. Efficiency of coconut based marigold face-pack was compared with basil oil based marigold petals. The basil oil with a specific gravity of 0.91 to 0.94 and refractive index 1.49 to 1.52 with optical rotation of 5 to 10 was used.

The different formulations experimented with are mentioned in tabular form below:

**Table 1: Different formulations made for face-pack.**

No	Excipients	Formulation (%)			
		I	II	III	IV
1	Turmeric powder	25	25	25	25
2	Vekhand powder	20	20	20	10
3	Black cumin powder	20	13	05	10
4	Fullers earth	05	05	06	04
5	Marigold crushed	10	15	20	25
6	Coconut oil	20	22	24	26
7	Basil oil	20	22	24	26

In all the above formulation powders were accurately weighed and mixed. The coconut oil and basil oil was previously macerated with marigold petals and used further. The coconut oil was such mixed that it should form slurry. Extra coconut oil was added to obtain good consistency. Now the face pack is ready for application.

All cosmetic formulations after customer survey and modifications were subjected to chemical analysis according to the Bureau of Indian Standards. The face-pack was checked through different tests like pH, stability, residue on evaporation, and loss on drying and ash content.

A standard single or double electrode may be used. The instrument shall be initially calibrated at pH 7 and 9.2 with appropriate buffer solution. The test sample consisting of 10 percent dispersion of product of either type of face pack in previously boiled and cooled beaker and ph determined directly without any dilution within 5-10 minutes.

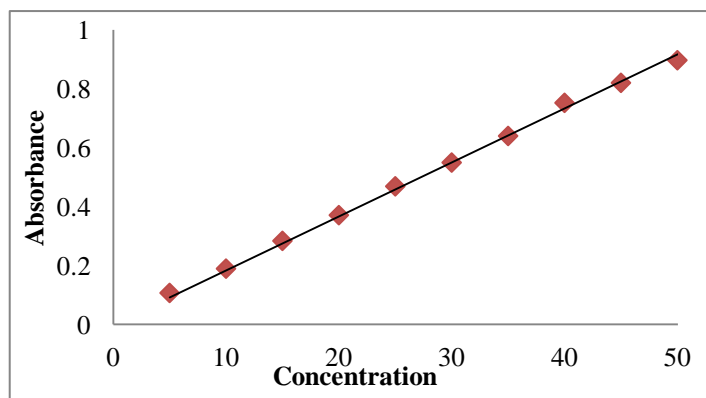
Take a glass bottle and fill to the three-fourth of its capacity with the product and close it with plug and cap tightly. Keep the bottle in an oven at  $45 \pm 1^\circ\text{C}$  for 48 hrs. Periodically examine the contents. The emulsion should not split leaving a separate layer. Neither the suspended pigments should settle.

Heat the clean petri dish in a hot air oven for 15-20 minutes. Place it in desiccators for 20 minutes. Weigh the petri dish approximately about 2-3 g of sample. Spread the product by rotating the petri dish or using the dry and clean spatula to form a layer. Then weigh the Petri dish accurately and keep it in an oven at  $105 \pm 2^\circ\text{C}$  for 3 hours. Cool in desiccators and weigh.

The ash content was also calculated for face-pack with coconut oil and basil oil. A 1 gram of sample was taken in a crucible. It was ignited with oxidizing flame till the sample gets completely charred. The crucible was transferred to a heating furnace at  $800^\circ\text{C}$  for 1 hour. Later it was taken out, cooled, and weighted.

#### IV. Results

The crushed marigold petals were kept for maceration with basil oil for 7 days and then the oil were tested for its absorbance at various wavelengths. **Fig. 3** shows the wavelength obtained w.r.t. concentration.



**Fig. 2:** Absorbance Vs Concentration for Marigold petals

The formulation IV was selected as final formulation to make face-pack with coconut oil. Formulation I and II was discarded for colour and formulation III was discarded for grittiness. Formulation IV was then given to customers for use.

The formulation III was selected for face-pack with basil oil. On the basis of its appealing odour while rest formulations like I, II and IV was not satisfactory in odour. Also the wash off ability was not good as compared to rest formulations

The pH value of the face pack with coconut oil mix was found to be 6 while that with basil oil was found to be 7.5. The stability test for the face-pack was found stable for both the oils. The determination of residue on evaporation and loss of drying was estimated for both the oils:

Residue on evaporation percent by mass

$$= 100 \times M_2 / M_1$$

Where M<sub>1</sub> = mass in g of the sample taken

M<sub>2</sub> = mass in g of the residue

Percent by mass of coconut oil face pack =  $100 \times 0.4 / 2 = 40\%$

Percent by mass of basil oil face pack

$$= 100 \times 0.2 / 2 = 10\%$$

From the results, it can be seen that the residue on evaporation for coconut oil face pack was found to be 40% and that of basil oil face pack was found to be 10%.

Calculation:

Percentage ash for coconut oil face pack

$$= \text{mass of residue} \times 100 / \text{mass of sample}$$

$$= 0.8 \times 100$$

$$= 80\%$$

Percentage ash for basil oil face pack

$$= \text{mass of residue} \times 100 / \text{mass of sample}$$

$$= 0.82 \times 100$$

$$= 82\%$$

From the above calculations, the ash content for coconut oil face pack was found to be 80% while that of basil oil face-pack is 82%.

## V. Conclusion

From the above results, it can be well concluded that the face pack with basil oil is more efficient than the face pack with the addition of coconut oil. Basil oil possesses excellent anti-inflammatory properties that work well in warding off skin irritations, small wounds, and sores. The soothing effect of basil oil face-pack helps in healing eczema. The goodness of vitamin C boosts skin cell's metabolism and elasticity. Customers review was also carried out for the prepared face-pack. The feedback received comments that the face-pack made from marigold petals and basil oil shows good cleansing of dirt, rejuvenates skin and acts moisturizing agent to dry skin.

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