

## Evaluation of Antimicrobial and Antifungal Activity of Cream Formulation of Gandhak

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### Abstract

Gandhak rasayan was selected for this study due to its broad-spectrum activity against microbial and fungal infections. The cream was formulated for external use to treat infections. To boost its effectiveness, neem oil and kalonji oil were incorporated. The primary goal was to create an affordable herbal cream that offers fewer side effects and greater benefits as an antifungal agent compared to the allopathic medications available in the market

**Keywords:** Gandhak, Cream, Antifungal, Antibacterial

### Introduction:

Gandhak refers to sulfur, which has various applications in the pharmaceutical and medical fields. Sulfur compounds exhibit antimicrobial properties and are used in treating skin conditions like acne, eczema, and psoriasis. Sulfur is often included in topical formulations, ointments, and creams for its therapeutic effects. In traditional systems of medicine, such as Ayurveda, sulfur is used for its purifying and detoxifying properties. Pharmacists may use sulfur in compounding medications to create personalized formulations for patients. While sulfur is generally considered safe, its use should be monitored to avoid skin irritation or allergic reactions<sup>1</sup>.

### Materials and Method:

Gandhak, Aloe vera, Turmeric, Coconut oil, Neem oil, Kalonji oil, Borax, Paraffin wax, Propyl paraben, Polyethylene glycol, Distilled water and Rose water were taken of analytical grades.

### Methods

#### Formulation of cream

Trituration (Latin, grinding) is the name of several different methods used to process materials. In one sense, it is a form of comminution (reducing the particle size of a substance). In another sense, it is the production of a homogeneous powdered material by mixing and grinding component materials thoroughly. Trituration is a mixture of one or more finely ground powdered drugs. The trituration is a mix of a finely ground drug and lactose. By triturating the grinding of a solid substances is done to fine powder by continuous strike in or rubbing the particles in a mortar with a pestle. The term trituration is also employed to designed the process by which two or more powders are intimately mixed with each other. For this purpose, a pestle and mortar made of, porcelain or glass is used. For hard materials steel mortar and pestle may be used<sup>2-3</sup>.

S.no.	Ingredients (for 30 ml)	F1	F 2
1	Gandhak	4 gm	4 gm
2	Aloe vera	3 gm	-
3	Turmeric	2 ml	2ml
4	Coconut oil	5ml	5ml
5	Kalonji oil	3ml	3ml
6	Neem oil	2ml	2ml
7	Paraffin wax	5gm	5gm
8	Borax	0.4 gm	0.4 gm
9	Propyl paraben	0.08 gm	0.08 gm
10	Polyethylene glycol	3 ml	3 ml
11	Distilled water	q. s.	q. s.
12	Rose water	q. s.	q. s.

### Procedure of herbal anti-fungal cream

There are 2 formulations of herbal anti-fungal cream has been prepared.1 consist of aloe vera gel and other does not.

#### Preparation for oil phase

- Take purified Gandhak Rasayan, weigh the quantity needed to prepare cream, triturate it using mortar pestle followed by size reduction using mechanical sieve shaker to get fine particle.
- Take the fine powder of Gandhak in mortar pestle triturate it using weighed quantity of coconut oil simultaneously add neem oil and kalonji oil with continuous trituration.
- Add paraffin wax to the above mixture and continue triturating it to get homogenous product. Add preservative propyl paraben.
- Before mixing the two phases add polyethylene glycol in oil phase.

#### Preparation of Aqueous phase

In a beaker heat weighed quantity of borax and distilled water until it gets dissolved. Cool it.

#### Mixing of two phases

- Add aqueous phase slowly to the oil phase with continue stirring or triturating (without heat). Add turmeric extract with continuous stirring and add fresh aloe Vera gel (only in one formulation). Continue mixing of two

phases until a smooth consistency of cream is obtained

- Last step is to add rose water as fragrance and mix it uniformly.
- Fill in a container and label it.

#### Evaluation of Antimicrobial activity

Antimicrobial susceptibility tests are used to determine which specific antibiotics a particular bacteria or fungus is sensitive to. Most often, this testing complements a Gram stain and culture, the results of which are obtained much sooner. Antimicrobial susceptibility tests can guide the physician in drug choice and dosage for difficult-to-treat infections.

- To prepare 1 Liter of nutrient broth, warm 500ml of water in a beaker.
- Dissolve peptone, beef extract and sodium chloride in it with continuous shaking.
- Check the pH and add remaining 500ml of water.
- To make solid medium add desired quantity of agar to broth.
- Plug it with cotton plug and autoclave it at 121°C for 20 minutes<sup>4</sup>.

#### Results & discussion

It is found that cream shows successful antimicrobial effect and it can be used as topical medication for treating fungal and bacterial infection. Hence improving patient compliance

Anti-microbial test	Formulation 1	Formulation 2
Result	Shows high anti-microbial activity compare to formulation 2	Shows anti-microbial activity

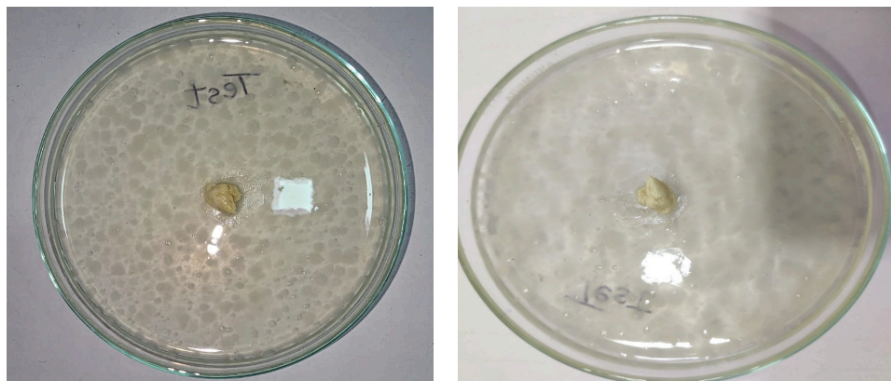


Figure 1: a) formulation 1 b) formulation 2

**Conclusion:**

In the present work, formulation and evaluation of herbal antifungal cream of Gandhak Rasayan was carried out. In the project two formulations of creams were prepared one contains aloe vera gel while other lacks. In the above formulation the aloe vera gel containing cream showed best result. Gandhak has fungicidal and anti-parasitic effect and mainly used in various skin disease like dermatitis, psoriasis, eczema and more. It was chosen as model drug. Gandhak is soluble in coconut oil, neem oil, kalonji oil and insoluble in water. It shows excellent result with coconut oil, neem oil shows synergistic effect with Gandhak. Kalonji oil and seed powder exhibit anti-bacterial properties and can effectively fight certain types of bacteria. Topical application of Kalonji oil on the skin infection caused due to streptococcal bacteria heals the skin and reduces redness. Neem oil is rich in fatty acids Trusted Source, such as palmitic, linoleic, and oleic acids, which help support healthy skin Trusted Source. The oil is, therefore, a popular ingredient in skin care products. Preformulation studies were carried out for drugs and excipients. Drug and excipients were compatible with each other. The formulations were prepared by trituration method. In trituration the first step was particle size reduction followed by preparation of oil

and aqueous phase and last step was mixing of two phases. The Gandhak was dissolved in coconut oil without heating because it formed crystals on heating. Cream showed good antimicrobial activity.

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