



## Formulation and Evaluation of Anti-fungal Paste of *Acorus calamus*

<sup>1</sup>Mr.Tawheed M. Parkar , <sup>2</sup>Mr. Ajay M. Pansare, <sup>3</sup>Ms. Nazneen Nithore, <sup>4</sup>Mrs. Sana Attar

<sup>1</sup> U.G.Student, Allana College of Pharmacy, Pune, Maharashtra, India, <sup>2</sup> U.G.Student, Allana College of Pharmacy, Pune, Maharashtra, <sup>3</sup> U.G.Student, Allana College of Pharmacy, Pune, Maharashtra, <sup>4</sup>Assistant Professor, Allana College of Pharmacy, Pune, Maharashtra,

<sup>1</sup> Allana College of Pharmacy, Pune , India

**Abstract:** Sweet flag (*Acorus calamus*) has a long history of use and several traditional and ethnomedicinal uses. It has been used for the treatment of various ailments such as nervous disorders, appetite loss, bronchitis, chest pain, colic, cramps, diarrhoea, digestive disorders, flatulence, gas, indigestion, rheumatism, sedative, cough, fever, bronchitis, inflammation, depression, tumours, haemorrhoids, skin diseases, numbness, general debility, and vascular disorders since ancient times in various systems of medicine such as Ayur. Given the use of *Acorus calamus* in creams, this formulation will be multipurpose, with anti-rheumatic properties, anti-eczema properties, and the ability to lower body temperature (antipyretic) in youngsters.

**Keywords:** *Acorus calamus*, Anti-Fungal, Fusion method

### I. INTRODUCTION

*Acorus calamus* is well known for its actions on the G.I.T. and as an effective medicine for common cold and cough. Its use as an anti-fungal is not seen much often, which needs to be changed. The traditional methods of making a paste of *Acorus calamus* is not a standard formula and needs standardization and more accurate formulation was necessary to be formulated. The traditional formulation of the paste had stability issues and couldn't be stored for longer period of time thus was required to formulate again and again which is a tedious job. Herbal medicines are often unnoticed in the era of allopathic and synthetic medicines, which slowly is changing. The formulation is herbal and needs to be brought to the notice of the users. Skin diseases like eczema and fungal infections are well cured by herbal medicines, but herbal methods of treatment are not used. Instead synthetic creams are used. Synthetic creams usually end up being harsh for the skin and result into more problems.

### II. METHODOLOGY

#### Raw Materials:

Sr. No.	Ingredient	Category
1.	<i>Acorus calamus</i>	A.P.I.(Anti-fungal)
2.	Salicylic Acid	A.P.I (Anti-fungal)
3.	Starch	Base for preparation
4.	Soft Paraffin (yellow)	Rheology modifier
5.	Rose oil	Fragrance



**Fig. 1:** Raw materials for the formulation

#### ***Acorus calamus:***

*Acorus calamus* (Sweet flag) has a long history of use and has numerous traditional and ethnomedicinal applications. Since ancient times, it has been used in various systems of medicines such as Ayurveda, Unani, Siddha, Chinese medicine, etc. for the treatment of various ailments like nervous disorders, appetite loss, bronchitis, chest pain, colic, cramps, diarrhea, digestive disorders, flatulence, gas, indigestion, rheumatism, sedative, cough, fever, bronchitis, inflammation, depression, tumors, hemorrhoids, skin diseases, numbness, general debility and vascular disorders. Considering the use of *Acorus calamus* in creams, this formulation will be multipurpose showing anti-rheumatic property and would also show action against eczema and will lower body temperature (antipyretic) in children.

#### **Starch:**

Starch is a naturally occurring substance that is commonly available. Because of its various physical and functional qualities, it has found employment in a variety of sectors. Because of the large number of hydroxyl groups on the surface, a variety of modifications or derivatives can be made. It is widely used as an excipient in the pharmaceutical industry, particularly as a disintegrant and binder in the manufacture of solid dosage forms.

#### **Yellow soft paraffin:**

Yellow petroleum jelly is another name for yellow soft paraffin. This is not an active component per se, but it acts as a moisturiser by forming a coating of oil on the skin's surface to prevent water from evaporating. It's a heavy-duty moisturiser. The lack of water in the stratum corneum, the outer layer of skin cells, causes dry skin. This layer loses its flexibility when it becomes dehydrated, becoming cracked, scaly, and irritating. Water is generally held in the stratum corneum by a surface coating of natural oil (sebum) and broken-down skin cells, and it also contains natural water-holding chemicals that retain water seeping up from the deeper layers of the skin which can reduce water evaporation from the skin's surface.

#### **Salicylic acid:**

Acne sufferers use topical salicylic acid to help cure and prevent pimples and skin blemishes. Psoriasis (a skin illness in which red, scaly patches appear on various parts of the body), ichthyoses (inborn disorders that cause skin dryness and scaling), dandruff, corns, calluses, and warts on the hands and feet are all treated with topical salicylic acid.

#### **Rose oil**

To begin with, pure Rose Oil is an antimicrobial agent. One of the reasons it works on acne-prone skin is because of this. It has the ability to both nourish and clean the skin. It's so powerful, in fact, that it's also used to heal scars and other skin flaws.

#### **Method of formulation:**

When the medicines and other solids are soluble in the ointment bases, the fusion process is used. The soluble components are dissolved in the molten base once the base has been liquefied.

To achieve a smooth texture, the congeal mixture is hypothesised or triturated. During the fusion process, care is taken to avoid heat damage of the base or other components.

#### **Formula :** (For paste of total 30gm)

Starch (finely sifted):	7.2gm
<i>Acorus calamus</i> (finely sifted):	7.2gm
Salicylic acid (finely sifted):	0.6gm
Yellow soft paraffin:	15.0gm

#### **Procedure:**

1. In a water bath, melt the yellow soft paraffin.
2. Mix in the starch, *Acorus calamus*, and salicylic acid that have been sieved through sieve number 120.
3. Stir until the paste is cold and homogeneous.
4. Label and dispense the product.



**Fig. 2:** Formulation Procedure, Fusion Method

#### Evaluation:

##### Pre formulation parameters:

- **Total ash:**

Take about 2 or 3 g, accurately weighed, of the ground drug in a tarred platinum or silica dish previously ignited and weighed. Scatter the ground drug in a fine even layer on the bottom of the dish. Incarnated by gradually increasing the heat- not exceeding dull red heat- until free from carbon, cool and weigh. If a carbon free ash cannot be obtained in this way, exhaust the charred mass with hot water, collect the residue on an ash less filter paper, increase the residue and filter paper, add the filtrate, evaporate to dryness and ignite at low temperature. Calculate the percentage of ash with reference to the air dried drug.

- **Acid- insoluble ash:**

Boil the whole ash with 25 mL dilute hydrochloric acid for five minutes, collect the insoluble matter in a Gooch crucible or on ash-free filter paper, wash with hot water, ignite, and weigh. Calculate the percentage of acid-insoluble ash using the air-dried medication as a reference.

- **Water- soluble ash:**

Collect the insoluble materials in a Gooch crucible or on ashless filter paper, wash with hot water, and ignite to constant weight at a low temperature. Subtract the weight of insoluble materials from the weight of ash; the weight difference is the water-soluble ash. Calculate the proportion of water-soluble ash using the air-dried medication as a reference.

##### Post formulation parameters:

- **pH :**

A digital pH metre was used to determine the pH of various mixtures. 1 g of cream was weighed and diluted in 100 mL distilled water before being stored for two hours. Each formulation's pH was measured three times and the average values were calculated. A digital pH metre was used to determine the pH of various mixtures. 1 g of cream was weighed and diluted in 100 mL distilled water before being stored for two hours. Each formulation's pH was measured three times and the average values were calculated.

- **Viscosity:**

Brookfield Viscometer was used to determine the viscosity of the formulation. The measurements were made in triplicate at 20 rpm at a temperature of 25°C, with the average of three readings recorded.

- **Rheological properties:**

To determine the flow behaviour of the formulation, the rheological property was determined. The viscosity was determined using a Brookfield viscometer at various rpms. By putting 100 g of cream in the beaker, the rheological behaviour of the formulation was investigated.

- **Spreadability**

The Spreadability parameter was measured in seconds. Under certain load, remove two slides from the cream and arrange them in between the slides. Spreadability improves with less time spent separating the two slides.

- **Skin Friction:**

In comparison to wet and dry skin, damp (slightly moist) skin has a high friction surface. The effect of hydration on the stratum corneum and the process of moisturization are linked in this study of friction surfaces. Frictional qualities are also linked to the elasticity of skin and aid in evaluating product performance.

#### IV. RESULTS AND DISCUSSION

Sr. no.	Parameter	Observation
1.	Total Ash Value	8.71 %
2.	Acid Insoluble Ash Value	0.98 %
3.	Water Soluble Ash Value	19.86 %
4.	Appearance	Brown
5.	Odour	Pleasant
6.	pH	6.9
7.	Viscosity	43,334 cP
8.	Spread ability	8.41 cm/s
9.	Skin sensitivity	No reaction
10.	Rheology	Good flow

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#### VI. CONCLUSION

To begin with *Acorus calamus* is not commercially used as an antifungal despite of the studies done on it which prove its properties as antifungal. Thus it was an attempt to formulate an antifungal paste put of *Acorus calamus*. The raw materials were bought/brought from authentic sources and were good in terms of quality. The pre formulation tests done on the crude drug were found to be passing the limits. The fusion method was found to be the best method for formulation of the paste, as it allowed the API and the excipients to dissolve well in to the yellow soft paraffin. The post formulation tests showed that the formulation is safe to use and passed the basic lab scale tests. The formulation showed no harmful reaction to the skin like redness, itching or inflammation. Thus the conclusion so far is that formulation of antifungal cream of *Acorus calamus* was successful, yet further high profile tests would be required to confirm the stability and working of the formulation.

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