

**International Journal of Research Publication and Reviews** 

Journal homepage: www.ijrpr.com ISSN 2582-7421

# **"Formulation and Evaluation of an Herbal Topical Emulsion Containing Yellow Mustard Seed Extract for Skin Care Applications"**

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## Abstract:

Herbal-based formulations are gaining popularity in modern pharmaceuticals due to their safety profile, biocompatibility, and therapeutic efficacy. Yellow mustard (Sinapi's alba), a medicinal plant from the Brassicaceae family, is known for its therapeutic effects, which are linked to its active ingredient, sinalbin, a type of glucosinolate. Sinapi's alba has gained popularity for its powerful anti-inflammatory, antibacterial, and anti-irritant effects. In the current study, Sinapi's alba (yellow mustard) is preferred over Brassica nigra (black mustard) due to its safety, tolerability, stability, and milder bioactivity, making it more acceptable for regular topical treatment as opposed to black mustard's harsh and irritating character.

Topical drug delivery systems have received a lot of interest in recent years because of their capacity to provide targeted treatment, circumvent first-pass metabolism, and increase patient compliance. Among these, emulsion offers the combined benefits of emollient qualities and increased penetration through the skin.

Keywords: Topical, Emollient, Targeted, anti-inflammatory, antibacterial, Emulsion.

## 1. Introduction:

Yellow mustard, scientifically known as Sinapi's alba, is a plant in the Brassicaceae family. It produces small, spherical, light-yellow seeds, which are commonly used as a spice and in mustard sauces. Traditionally, it was used to assist digestion, reduce inflammation, and alleviate discomfort. Yellow mustard's natural characteristics make it useful for herbal treatments, cosmetics, and even natural pesticides.

Sinapi's alba, or yellow mustard, is an annual herbaceous medicinal plant from the Brassicaceae family. Its seeds are commonly utilized in culinary and medicinal purposes. The seeds contain the glucosinolate sinalbin, which, upon enzymatic hydrolysis, produces p-hydroxybenzyl isothiocyanate, a chemical renowned for its anti-inflammatory, antibacterial, and moderate counterirritant qualities. Yellow mustard is less pungent and more skin-tolerant, making it more suited for topical medicinal uses.

In recent years, there has been a surge of interest in integrating herbal extracts into current dosage forms to improve therapeutic outcomes while avoiding adverse effects. Among these, emulsion-based systems have proven to be excellent transporters of both hydrophilic and lipophilic components. Emulsions provide benefits such as increased skin penetration, ease of administration, and greater stability of active components.

The project entails the creation and testing of an emulsion with yellow mustard as the primary constituent. The goal was to create a stable and effective formulation by selecting acceptable excipients and improving the technique of production. Key formulation parameters such as pH, viscosity, and physical stability were assessed. The final product was evaluated for quality qualities and determined to fulfill the required criteria. This formulation has potential as a topical anti-inflammatory, analgesic, and rubefacient formulation.

## 2. History of Yellow mustard:

Yellow mustard (Sinapi's alba) originated in the Mediterranean region and has been utilized since ancient times by civilizations including the Egyptians, Greeks, and Romans. The Romans are credited with developing an early kind of mustard paste by combining crushed seeds and wine or vinegar. Yellow mustard spread throughout Europe and Asia, becoming a popular element in culinary activities as well as traditional remedies such as Ayurveda and

Chinese medicinal systems. Yellow mustard (Sinapi's alba or Brassica alba), which is often used as a spice and condiment, has various pharmacogenetic effects due to its high phytochemical content.

## 3. Pharmacognostic Properties of Yellow Mustard:

#### 1. Macroscopic Characteristics-

Seeds are small, round, and yellowish-white in color. Odorless and tasteless until crushed; then emit a pungent smell.

## 2. Microscopic Characteristics-

Seed coat has mucilaginous epidermal cells.

Contains aleurone grains and oil globules in the endosperm.

#### 3. Organoleptic Properties-

Slightly bitter and pungent flavor develops after enzymatic breakdown. Mild characteristic odor when ground.

#### 4. Phytochemical Constituents-

Glucosinolates (notably sinalbin), fatty oils, mucilage, proteins, and flavonoids.

# Contains myrosinase enzyme, which hydrolyzes glucosinolates.

## 5. Powder Microscopy-

Powdered seeds show parenchyma cells, oil globules, and mucilage cells. Diagnostic features: sclereids and aleurone grains.

#### 6. Moisture Content-

Low moisture content is ideal for preservation and quality control.

## 7. Ash Values-

Total ash, acid-insoluble ash, and water-soluble ash help determine purity.

#### 8. Extractive Values-

Alcohol and water extractive values indicate the presence of active constituents.

#### 9. Fluorescence Analysis-

Powder and extracts show characteristic fluorescence under UV light

#### 10. Chromatographic Profile-

Thin-layer chromatography (TLC) can be used to identify glucosinolates and flavonoids.

#### 11. Physicochemical Parameters-

Includes bulk density, pH of 1% solution, and swelling index.

## 4. Main Ingredients for Herbal Topical Emulsion:



Fig. No. 1 Yellow mustard mucilage, Coconut oil, Flaxseed gel, Aloe vera juice, Vitamin E Capsule, Rose water.

## 5. Formulation Profile of Herbal Topical Emulsion:

Sr. No	Ingredients	Quantity
1.	Yellow mustard mucilage	5 ml
2.	Coconut oil	10 ml
3.	Flaxseed gel	15 ml.
4.	Aloe vera	10 ml.
5.	Vitamin E Capsule	50 ml
6.	Rose Water	3 ml.

6. Formulated Sample of Herbal Topical Emulsion:



Fig. No. 2 Formulated Sample of Emulsion.

## 7. Method of Preparation of Herbal Topical Emulsion:

#### Step 1 Preparation of yellow mustard extract -

Yellow mustard extract was created by soaking the seeds in distilled water overnight, then grinding them with a mortar and pestle and filtering the extract through a muslin cloth.

#### Step 2 Production of flaxseed gel -

Flaxseed gel is made by boiling flaxseed in water, which creates a gel-like liquid after cooling.

Step 3 Oil phase preparation: Warm coconut oil slightly, but avoid overheating.

## Step 4 Water Phase -

Warm the flax seed mucilage, aloe vera juice, and rose water to the same temperature.

#### Step 5 Emulsification -

To create a thick, creamy emulsion, gradually add the oil phase while combining. Cool and finish the process.

Step 6 - Once emulsified, add Vitamin E oil while the liquid is warm but not hot. Cool the emulsion to room temperature.

## 8. Physical Evaluation Parameter and Results of Herbal Topical Emulsion:

Table No. 2 Physical	Evaluation Parameter	r of Herbal Topical	Emulsion.

Sr. No	Parameter	Observation
1.	Color	Yellowish White
2.	Oduors	pleasant herbal aroma
3.	Appearance	Soft
4.	Texture	Smooth
5.	Spread ability	Uniform
6.	Stability	Stable at Room Temp.
7.	Consistency	semi- viscous
8.	Homogenecity	Good

9.	Skin Irritation Test	No Irritation
10.	Viscosity	600 сР
11.	Grittiness	Non-Gritty
12.	рН	5.7
13.	Color Stability	No change for one month.
14.	Washability	Easily Washable

### 9. Conclusion:

The current study effectively developed a stable herbal topical emulsion incorporating yellow mustard (Sinapi's alba) seed extract to improve skin care advantages. The produced emulsion demonstrated acceptable physicochemical parameters such as homogeneity, pH, viscosity, and Spreadability, indicating its suitability for topical application.

During the test period, the formulation displayed good stability of storage settings, with no symptoms of phase separation or microbiological contamination. Overall, the findings indicate that herbal emulsion has potential as a natural and effective skin care product. However, more in vivo research and dermatological testing are needed to confirm its safety, efficacy, and therapeutic potential in clinical settings.

#### **Conflict of Interests:**

The authors declare that they have no known competing financial interests or personal relationship that could have appeared to influence the work reported in this paper.

#### 10. Acknowledgment:

The authors are grateful to Yashoda Shikshan Prasarak Mandals, Yashoda Technical Campus, Faculty of Pharmacy, Satara-415011. The necessary facilities and support to carry out this work.

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