

## Formulation and Evaluation of Carica Papaya Latex Cream

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Date of Submission: 01-05-2024

Date of Acceptance: 10-05-2024

### ABSTRACT

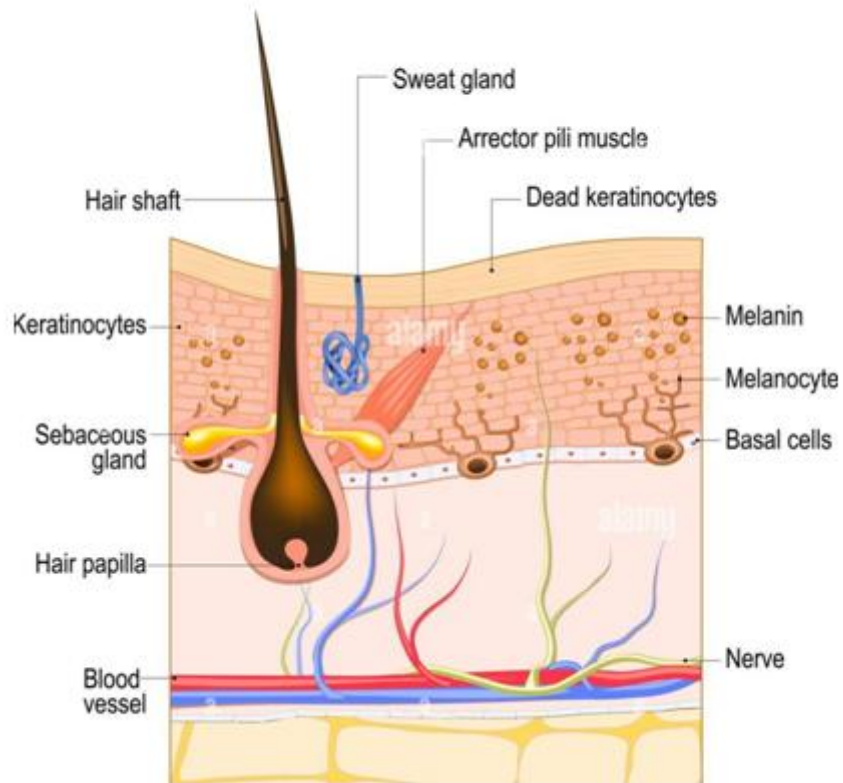
Herbal cosmetics are prepared for enhancement of skin or appearance of human and it gives the external appearance better than reality. The aim of research used to formulate and evaluate the antibacterial cream, in what we are using API is consisting different activities they are anti bacterial activity, anti inflammatory, wound healing, antioxidant, Anthelmintic [anti parasitic]. Although it has other properties they are emulsifying and coagulant properties. So we are using in this project carica papaya latex, unripe papaya fruit contains papaya latex which contains enzyme

papain. In ancient days the carica papaya latex used as medicinal purpose and it used as traditional medicine, the fruit and seeds are also used in folk remedies for ailments like digestive disorders, skin problems & parasitic infections. It has one disadvantage which is allergic reaction when it is applied as in the form of raw usage, but we excluding in the formulation with the help of anti allergic agents and by dilution of latex

**KEY WORDS ;** Anti bacterial cream, carica papaya latex, latex powder, oil in water, Homogeneity, pH.

### I. INTRODUCTION

## Structure of the skin



The skin is the largest organ of the human body, serving as a protective barrier against external threats, regulating temperature, and facilitating sensation. Its structure consists of three main layers: the epidermis, the dermis, and the hypodermis (subcutaneous tissue).

### SKIN LAYERS

1. **Epidermis:** This is the outermost layer of the skin, primarily composed of epithelial cells. It serves as a protective barrier against pathogens, UV radiation, and chemical exposure. The epidermis itself consists of several layers:

**Stratum corneum:** The outermost layer of the epidermis, composed of dead skin cells (keratinocytes) that are continuously shed and replaced.

**Stratum lucidum:** Present only in thick, hairless skin like the palms and soles, this layer consists of translucent cells.

**Stratum granulosum:** Contains granular cells that produce lipids and proteins that help waterproof the skin.

**Stratum spinosum:** This layer provides strength and flexibility to the skin.

**Stratum basale (or stratum germinativum):** The innermost layer of the epidermis where new skin cells are produced. It also contains melanocytes responsible for producing melanin, which gives skin its color and helps protect against UV radiation.

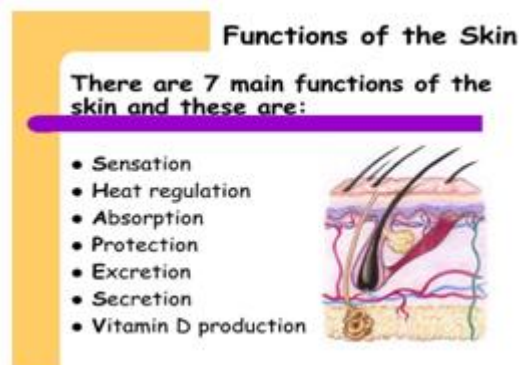
2. **Dermis:** The dermis lies beneath the epidermis and is composed of connective tissue rich in collagen and elastin fibers. It provides structural support and elasticity to the skin. The dermis contains blood vessels, nerve endings, hair follicles, sweat glands, and sebaceous glands. It consists of two main layers:

**Papillary layer:** The superficial layer of the dermis, composed of loose connective tissue with finger-like projections called dermal papillae. These papillae interlock with the epidermis, increasing surface area and enhancing grip.

**Reticular layer:** The deeper and thicker layer of the dermis, containing dense irregular connective tissue, blood vessels, nerves, hair follicles, and glands.

3. **Hypodermis (Subcutaneous tissue):** This is the deepest layer of the skin, consisting of adipose tissue (fat) and connective tissue. It serves as insulation, energy storage, and cushioning for the body. The hypodermis also contains larger blood vessels and nerves that supply the skin and underlying tissues.

### FUNCTIONS OF THE SKIN

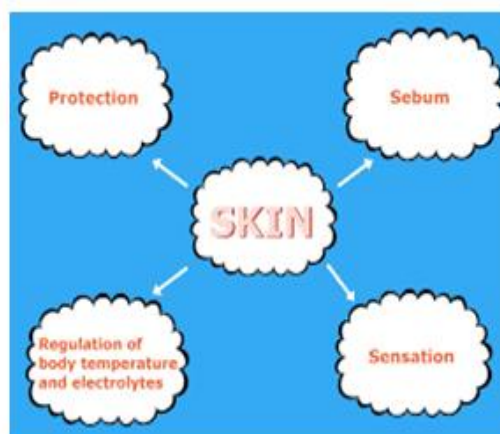


The skin is an incredibly versatile organ with several vital functions:

**Protection:** It acts as a barrier against harmful substances, pathogens, and UV radiation. The outermost layer of the skin, called the epidermis, provides a tough barrier against physical damage and infection.

**Excretion:** Small amounts of waste products, such as salts and water, are eliminated through sweat glands in the skin. This helps maintain the balance of electrolytes and fluids in the body.

**Absorption:** Certain substances can be absorbed through the skin, such as medications in the form of creams or patches. However, the skin's barrier function limits the absorption of most substances, protecting the body from harmful chemicals.



**Synthesis of Vitamin D:** When exposed to UVB radiation from sunlight, the skin produces vitamin D, which is essential for maintaining healthy bones and overall immune function.

**Immune Function:** The skin contains specialized immune cells that help defend the body against infections. In response to injury or infection, the

skin can initiate an inflammatory response to fight off pathogens and promote healing.

Regulation of Water Balance: The skin helps prevent excessive water loss from the body,

maintaining proper hydration levels. The lipid barrier in the epidermis helps seal in moisture and prevent dehydration.



### INTRODUCTION TO THE ANTI BACTERIAL CREAM

- Herbal creams are skincare products formulated with natural ingredients derived from plants. These creams often contain botanical extracts, essential oils, and other plant-based compounds known for their skin-nourishing and therapeutic properties.
- ingredient may offer different benefits for the skin, such as hydration, soothing irritation, reducing inflammation, or providing antioxidant protection.
- Herbal creams can be used for various purposes, including moisturizing, soothing dry or irritated skin, reducing signs of aging, and treating specific skin concerns like acne or eczema.

The creams are existed as ;

- ✓ Moisturizing
- ✓ Soothing
- ✓ protecting

- Creams typically consist of water and oil phases. The water phase usually contains ingredients like water, herbal extracts, or hydrosols, while the oil phase contains oils and fats such as mineral oil, vegetable oils, or waxes.



- Creams can vary in their consistency and texture, ranging from light lotions to thick ointments, depending on the proportions of water and oil phases, as well as the choice of emulsifiers and other additives
- Emulsifiers work by forming a layer around the dispersed droplets, preventing them from coalescing and separating. Common emulsifiers used in creams include surfactants like polysorbates, glyceryl stearate, and cetearyl alcohol.



### TYPES OF CREAMS

They are divided into two types:

**Oil-in-Water (O/W) creams** which are composed of small droplets of oil dispersed in a continuous phase, and an emulsion in which the oil is dispersed as droplets throughout the aqueous phase is termed an oil-in-water (O/W) emulsion.

**Water-in-Oil (W/O) creams** which are composed of small droplets of water dispersed in a continuous oily phase. When water is the dispersed phase and an oil the dispersion medium, the emulsion is of the water-in-oil (W/O) type.

Creams can be divided into two main types:

- **Aqueous Creams:** These emulsions are oil-in-water type, meaning water droplets are dispersed in an oily base. They can be easily removed from the skin due to the presence of water-soluble bases. **Composition:** Aqueous cream contains the following common ingredients:
  - Liquid hydrocarbons
  - White soft paraffin wax
  - Purified water
  - Emulsifying wax containing sodium lauryl sulfate
  - Cetostearyl alcohol

### Benefits of Aqueous Cream:

- **Moisturization:** Aqueous cream effectively hydrates dry skin without leaving a greasy residue.
- **Eczema Treatment:** It can be used to relieve eczema symptoms.
- **Soap Alternative:** Aqueous cream can replace soap. As a cleansing product, it forms an oil coating on the skin's surface, trapping moisture and preventing evaporation.
- **Skin Smoothing:** By maintaining natural moisture, it reduces the sensation of dryness and keeps the skin smooth

**Oily Creams:** These emulsions are water-in-oil type, where oil droplets are dispersed in a water base. Oily creams are often richer and more moisturizing

### Advantages of Oily Creams:

- **Moisturization:** Oily creams provide excellent moisturization, especially in dry conditions.
- **Barrier Protection:** Their oil-based formulation creates a protective barrier on the skin, preventing dehydration.
- **Versatility:** Oily creams can be used on various skin types and even as an effective eye makeup remover due to their emollient nature.

### O/W Emulsion Type Creams:

- Composed of small oil droplets dispersed in a continuous water phase.
- Examples:
  1. **Vanishing creams**
  2. **Foundation creams**
  3. **Shaving creams** These creams are less greasy and easily washed off with water.

### W/O Emulsion Type Creams:

- Composed of small water droplets dispersed in a continuous oily phase.
- Examples:
  - **Cold creams** (also known as fatty creams)
  - **Emollient creams**
- These provide an oily barrier, reducing water loss from the skin's outermost layer (stratum corneum)



Cold cream



foundation cream



Vanishing cream



#### ADVANTAGES :

**Hydration and Moisturization:** Skin creams provide essential moisture to the skin, preventing dryness and flakiness. Proper hydration is crucial for maintaining skin health and suppleness.

**Anti-Aging Properties:** Many skin creams contain ingredients like **vitamin C**, which has potent antioxidant properties.

**Even Skin Tone and Brightening:** Skin creams can address issues like hyperpigmentation and dark spots, promoting a more even complexion.

**Skin brightening:** Vitamin C serums and creams help reduce pigmentation irregularities and enhance skin radiance.

**Sun Protection:** Day creams often include a **sun protection factor (SPF)**, shielding the skin from harmful UV rays.

#### DISADVANTAGES :

While skin creams can offer numerous benefits, it's important to be aware of their potential disadvantages as well. Here are some of the drawbacks associated with the use of skin creams:

**Chemical Sensitivity and Allergies:** Some individuals may experience allergic reactions or sensitivity to certain chemicals found in skin creams.

**Over-Dependency:** Long-term use of certain creams, especially those with active ingredients, can lead to dependency.

**Ineffective Products:** Not all skin creams are created equal. Some may not deliver the promised results, leading to disappointment and wasted expenses.

**Time-Consuming Application:** Applying skin creams, especially as part of a comprehensive skincare routine, can be time-consuming and may require a significant commitment<sup>3</sup>.

**Complicated Regimens:** If multiple products are prescribed, the regimen can become complicated, which might lead to confusion or incorrect use

**Messy and Uncomfortable:** Some topical formulations can be messy or uncomfortable to apply, which might discourage consistent use<sup>3</sup>.

**Preservation Issues:** Creams with an aqueous phase are prone to the growth of molds and bacteria, hence preservatives must be used to maintain their integrity<sup>4</sup>.

Remember, moderation is key, and understanding the ingredients and their effects on your skin will go a long way in ensuring a positive outcome.

#### AIM :

The aim of study is to perform literature review and extraction of latex from carica papaya. design the formulation & evaluation of latex cream , authentication of herbal ingredients and preparing extracts using different solvents.

#### OBJECTIVE :

- i. To select the herbal ingredient necessary for the preparation of cream
- ii. To study the properties of herbal ingredient used to prepare cream and design the formulation
- iii. Authentication of herbal ingredient.
- iv. To prepare extracts of carica papaya latex and using different solvents.
- v. Formulation and evaluation of cream.

#### METHOD :

EXTRACTION OF LATEX FROM THE CARICA PAPAYA

##### Traditional Method (Latex Collection):

- Make incisions on unripe papaya fruits.
- Collect the coagulated latex that flows from the cuts.



**Vacuum Drying Method:**

**Latex Collection:** Start by making incisions on unripe papaya fruits to collect the coagulated latex

that flows from the cuts. Using a vacuum drying process to remove moisture from the collected latex



The latex was placed in the hot air oven to reduce moisture content.

At 50 degree temperature heated it for 4 hours .

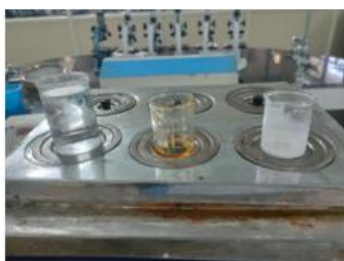
After dried latex shifted in to motor & pestle.

By grinding in the motor& pestle made in to fine powder later it is used as API.

### PREPARATION OF CARICA PAPAYA LATEX CREAM

Initially the 1g of latex was dissolved in the 2ml of chloroform , later for better dissolving added more 2ml of chloroform. The ingredients are

characterised according to the dissolving properties , it is water phase and oil phase. In oil phase 1g of bees wax and 1g of lanolin is added and placed on the electronic water bath. In water phase firstly we added 15 ml of distilled water , 1g of methyl cellulose , 2g of sodium alginate , 1g of PEG 2000, 1g of zinc oxide, sodium benzoate 0.1g and propyl glycol 0.1g, these ingredients are heated on the water bath . finally we added latex in to pestle then added as oil in water. After grinding in a pestle in a clock wise direction we got perfect textured cream.



### COMPOSITION OF HERBAL CREAM CONTAINING CARICA PAPAYA LATEX

Ingredients	Formulation code			
	F1	F2	F3	F4
latex	1g	1g	1g	1g
Wool fat	1g	-	-	1g
bees wax	-	-	1g	1g
sodium benzoate	0.1	0.1	0.1	-
sodium alginate	-	-	2g	2g
propyl paraben	-	-	0.1	0.1
zinc oxide	1g	1g	1g	1g
methyl cellulose	1g	1g	1g	-
poly ethylene glycol 2000	-	1g	1g	1g
Menthol	0.1	0.1	0.1	0.1
Rose oil	0.1	0.1	0.1	0.1
Almond oil	0.1	0.1	0.1	0.1
Distilled water	10ml	15ml	20ml	20ml



**Evaluation studies**

1. **pH Determination:** The pH was cadence was calibrated using pH 4 and pH 7 buffer results. We used ph paper for determination of cream . the ph of the whole latex cream was to be 6.9
2. **Physical Appearance:** It was observed that the colour of all the latex cream was white cremish with a translucent look, which on the application was found to be smooth.
3. **Homogeneity:** By visual examination of the appearance and presence of any lumps, flocculates, or aggregates, the produced latex cream was checked for homogeneity. The homogeneity of prepared cream has been shown to be fine.
4. **After feel :** emolliency slipperiness and amount of residue left after the application of fixed amount of cream was checked . the after feel of applied cream as shown to be good.
5. **Dye test :** The dye test is a simple method used to determine the type of emulsion in a cream.  
**W/O (Water-in-Oil) Type Cream:**Conversely, the disperse globules appear **colorless**, while the ground appears **red**, it indicates that the cream is a **W/O type** emulsion.In W/O creams, oil is the continuous phase, and water droplets are dispersed within it.
6. **Washability:** Washability test was carried out by applying a small amount of cream on the hand and then washing it with tap water. It is easily washable.
7. **Greasiness :** Here the cream was applied on the skin surface in the form of smear and checked if the smear was oily or grease-like. According to the results, we can say that formulations was non-greasy.
8. **Spreadability test:** The spreadability of the three formulations that is F1, and F4 was carried out and out of that for F4 the time taken by the 2 slides to separate is less so as said in the description of evaluation test lesser the time taken for separation of the two slides better the spreadability so according to this statement F4 showed better spreadability.
9. **Viscosity :** the formulation was determined was brookfield or ostwald viscometer at 100 RPM, using spindle no. 7 at temp 25 degree celsius. The determinations were carried out in triplicate and the average of three reading was recorded.
  - At 10 RPM - 5082cps
  - At 20 RPM -3059cp
  - At 50 RPM - 2998cps
  - At 100 RPM-1982cps
10. **Stability Studies:** These cream showed no physical instability, and there was no noticeable difference in the pH before and after the study.
11. **Anti Bacterial activity:** The study has been conducted using E.coli,Bacillus,Steptococcus,the formulations are found to be stable.

**II. RESULTS &DISCUSSION**

Parameters	Results			
	F1	F2	F3	F4
Physical appearance	Creamy white	Creamy white	Creamy white	Creamy white
Homogeneity	Homogenous	Homogenous	Homogenous	Homogenous
pH	6.82	6.76	6.23	6.92

Spreadability cm/sec	4.5	4.2	5.2	5.7
Saponification value	25.7	26.6	26.5	27.3
Acid value	5.9	6.0	5.5	5.6

**Viscosity:**

Formulations	RPM	Viscosity(cps)
F1	10	178.0
F2	10	173.0
F3	10	180.0
F4	10	182.0

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