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This Comprehensive research paper explores Formulation and Evaluation of Herbal Cream by using Ethanolic Extract of Carica papaya Leaves

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ABSTRACT:

This research was conducted to evaluate creams formulated using ethanolic extract of Carica papaya leaves. The leaves were collected; dried, and extracted by maceration method using ethanol. The antimicrobial activity of extract was determined using the pour plate method for viable counts and the minimum inhibitory concentration (MIC) by agar diffusion method. Test organisms used were Staphylococcus aureus, Bacilus subtilis, Pseudomonas aeruginosa, Escherichia coli, Aspergillus niger and Candida albicans. Carica papaya leaves ethanolic extract creams were formulated and evaluated for antimicrobial activity and physicochemical properties. The extract had good antimicrobial activity and MIC of 3.125 mg/ml against all the test organisms except Aspergillus niger which was not sensitive even at 100 mg/ml extract concentration. All the formulated creams retained their antibacterial activity but only Formulations F5 retained their antifungal activity against Candida albicans

The pH of the creams ranged from 4.6 to 7.6, while the viscosity was from 9790 to 95,100 mPas. All the creams were ranked excellent in terms of homogeneity and ease of removal. The spreadability ranged from 2.8±0.00 to 5.35±0.21 cm. This study showed that creams formulated using ethanolic extract Carica papaya leaves have good antimicrobial and physicochemical properties.

INTRODUCTION:

Fig 1: Papaya Leaves

Antimicrobial agents are natural or synthetic substances that kill or inhibit the growth of microbes like as fungi, bacteria and algae. Antimicrobials of natural origin are sourced from plants, animals or fungi. Antimicrobials sourced from plants are of great therapeutic importance. They are utilized in the cure of infectious diseases and in mitigating the untoward effects that occur due to use of synthetic antimicrobials. The uses of some plants due to their antimicrobial properties have been studied. They include Pterocarpus santalinoides are as follows Vernonia ambigua, Moringa oreifera, Myrtus communis and Flemingia grahamiana. Creams and ointment that possess antimicrobial properties were formulated by mixing antimicrobial agents and suitable

thickening and gelling agents. Antimicrobials of plant origin have been formulated into different dosage forms such as creams solutions, ointments and gels.

Creams are topical preparations usually applied externally to the skin. They are semi-solid emulsions or viscous liquids. They are formulated as oilin-water (o/w) or water-in-oil (w/o) creams. Pharmaceutical creams contain one or more medicinal agents dissolved or dispersed either in the emulsion or in another type of water -washable base.

HISTORY:

Origins and Early Spread

- *Carica papaya* is native to Mesoamerica, specifically southern Mexico and Central America, where it was first domesticated.
- The *Caricaceae f*amily, to which papaya belongs, originated in Africa and dispersed to Central America about 35 million years ago, likely via ocean currents.
- Papaya diverged from its closest relatives around 25 million years ago and is most closely related to genera endemic to Mexico and Guatemala.

Domestication and Cultivation

- Papaya was cultivated in Mesoamerica before the arrival of Europeans, but direct archaeological evidence is scarce due to challenges in identifying papaya remains.
- The Spanish were likely the first to spread papaya beyond the Americas in the early 16th century, introducing it to the Caribbean, then to Asia (Indonesia by 1526), and later to Africa via European colonial routes.

By the 18th and 19th centuries, papaya had reached India, Southeast Asia, and the Pacific, eventually becoming widespread in all tropical and many subtropical regions.

THERAPEUTIC EFFECT:

Protects, soothe, and moisturize the skin to get rid of blemishes on the skin and face Against dandruff Works as skin toner and skin cleanser.
Indigestion, clogging, farts, enhance hunger Pimples, skin inflammation, mouth ulcer Utilized to treat mouth ulcer and toothache Prophylactic in some Asian nations. In Southern China, lactating moms drink the soup to enhance drain stream Can cure dengue fever Used for dressing wounds and injuries, treating nervous pains, and elephantoid growths Cure of dyspepsia Beneficial in treating the tumors of uterus Used for syphilis in Africa and reduce urine concretions Bacteriostatic, bactericidal, and fungicidal Expel intestinal worms Utilized as a part of treating jaundice Utilized as a part of curing psoriasis and ringworm in Cuba.

- **Nutritional and Antioxidant Benefits**
- **Antibacterial effects**
- **Digestive Health**

Cultivation and Description

Formerly from southern Mexico (particularly Chiapas and Veracruz), Central America, and northern South America, the papaya is now cultivated in most tropical countries. In cultivation, it grows rapidly, fruiting within three years. It is, however, highly frost-sensitive, limiting its production to tropical climates. Temperatures below 29° Fahrenheit are greatly harmful if not fatal. In Florida, growth is generally limited to southern parts of the state. It also prefers sandy, well-drained soil as standing water will kill the plant within 24 hours. The papaya has a moderately complicated means of reproduction. The plants are male, hermaphrodite, or female. The male trees are uncommon, but sometimes occur when homeowners collect their own seeds. Hermaphrodite trees are the commercial standard, producing a pear shaped fruit. These plants are self pollinated.

Taxonomical Classification:

➢ **Kingdom** : Plantae	➢ **Varnacular Names:**
➢ **Subkingdom** : Tracheobionta	➢ **Hindi** : Papita
➢ **Division** : Magnoliospida	➢ **English** : Papaya
➢ **Class** : Magnoliospida	➢ **Eclectics** : Papaw
➢ **Family** : Caricaceae	➢ **Brazil** : Mamao

➢ **Genus** : Carica L.	➢ **Caribbean**: Ababai
➢ **Species** : Carica papaya L.	➢ **Cuba** : Fruta de bomba

MORPHOLOGY:

Papaya is a fast-growing, herbaceous perennial that typically reaches 2–10 meters in height.The plant usually has a single, hollow, semi-woody, erect stem, sometimes branching if injured.The trunk is cylindrical, 10–30 cm in diameter, hollow, with prominent leaf scars. Leaves are large (25–75 cm in diameter), deeply palmately lobed with 7–13 lobes, and are arranged spirally at the top of the trunk.Petioles are long (up to 1 meter), hollow, and greenish or purplish-green.The leaf surface is glabrous and prominently veined, with the underside pale green-yellow and opaque.Each leaf lives for 4–6 months.

CHEMICAL CONSTITUENTS:

Fruits:

Protein, fat, fibre, carbohydrates, minerals: calcium, phosphorous, iron, vitamin C, thiamine, riboflavin, niacin, and carotene, amino acids, citric and malic acids (green fruits), volatile compounds: linalool, benzyl isothiocyanate, cis and trans 2, 6-dimethyl-3,6 epoxy-7 octen-2-ol, Alkaloid, α; carpaine, benzyl-β-D glucoside, 2-phenylethyl-β-D glucoside, 4-hydroxy-phenyl-2 ethyl-β-D-glucoside and four isomeric malonated benzyl-β-D-glucosides.

Juice:

N-butyric, n-hexanoic and n-octanoic acids, lipids; myristic, palmitic, stearic, linoleic, linolenic and cis-vaccenic and oleic acids.

Seeds:

Fatty acids, crude protein, crude fibre, papaya oil, sinigrin, Carpaine, benzylisothiocyanate, benzyl glucosinolate, glucotropacolin, benzylthiourea, hentriacontane, β-sitosterol, caricin and an enzyme myrosin, leaves related alkaloids, flavonoids, saponins, tannins, cardiac glycoside, anthraquinones and cardinolodes.

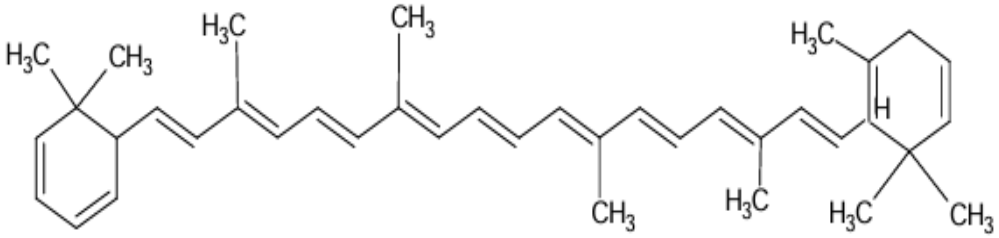

Figure 2. Beta- carotene

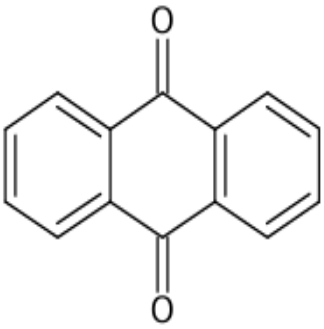

Figure 3. Anthraquinone

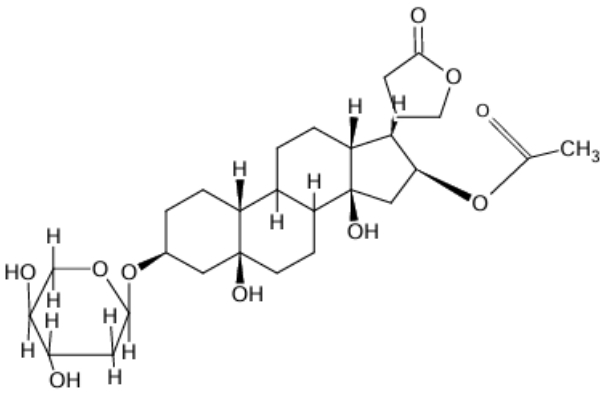

Figure 4. Cardiac glycoside

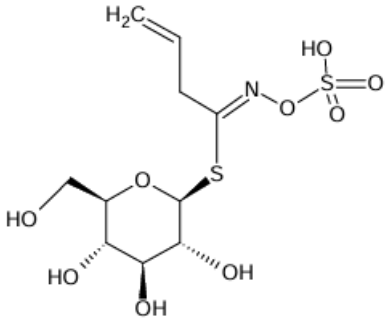

Figure 5. Sinigrin

- **Root:** Carposide and enzyme myrosin.
- **Leaves:** CH3 Alkaloids carpain, pseudocarpain and dehydrocarpaine I and II, choline, carposide, vitamin C and E.
- **Bark:** β-Sitosterol, glucose, fructose, sucrose, galactose and xylitol.
- **Latex** Proteolytic enzymes, papain and chemopapain, glutamine cyclotransferase, chymopapains A, B and C, peptidase A and B and lysozymes

MEDICINAL USES:

- Skin Healing and Wound Care
- Acne Treatment
- Skin Brightening and Anti-Aging
- Eczema and Psoriasis Relief
- Antifungal and Antibacterial Effects
- Mosquito Bite and Itch Relief

Litrature Review :

1. ANJANA GV.*et.al*. (2012)

Papaya is an evergreen blossoming plant having rich characteristic thing; it is recognized to offer different therapeutic purposes of premium. The normal item is sound and delicious. The entire plant parts such as root, bark, peel, seeds, blooms, leaves, and squash are known to have helpful properties. It is utilized for the treatment of a various infections such as dengue fever, warts, corns, sinuses, skin inflammation, against diabetic, glandular tumors, blood pressure, digestive disorders, constipation, antibacterial, antifertility, anti-HIV, expel worms, invigorate regenerative organs and many, as needs be it can be seen as a nutraceutical. The present review focuses on salient features of nutritional composition, health benefits, medical advantages, and synthetic constituents of papaya.

2. Esther Lydia,Mohammed,.*et.al* (2016)

Plants have the major advantage of being the most treasured and cheaper alternative supplies for drugs. Phytochemicals in fruits and vegetables have gained increasing interest among consumers and the scientific community as epidemiological studies have indicated that regular of phytochemicals is related to a lower risk of non-communicable diseases.

3. Maniyar Y, Bhixavatimat P.*et.al.*(2017)

India is considered as the diabetic capital of the world. The study of plants having antihyperglycemic and hypolipidemic activities may give a new approach in the treatment of diabetes mellitus.

4. Seth G.L Bihani *et.al*.(2017)

The foundation of the herbal medication business is the ethnomedical values of plants. In order to create herbal medications with minimal side effects, India has contributed its expertise in traditional system medicines (Ayurveda and Siddha). These plants have historically been utilized by tribal communities in India as extracts, powders, or pastes to cure conditions including anti- microbial activity, cough and colds, fever, stomach, kidney, and liver diseases, pain, inflammation, and wounds.

5. Zais Farda *et.al*.(2017)

Acne or acne vulgaris is a disease in the form of inflammation of multiple sebaceous glands caused by the bacteria Propionibacterium acne. Papaya leaves are a plant that can potentially be used as an acne treatment. To determine the antiacne activity of papaya leaf ethyl acetate fraction cream preparations caused by Propionibacterium acne bacteria. The ethyl acetate fraction of papaya leaves are made into a cream preparation with varying concentrations of ten, fifteen,and twenty percent. The results of the cream preparation test met the physical property standards. Still, the viscosity in formulation three did not meet the standards, and formulas two and three did not meet the cream stability test standards. Antibacterial tests show that all formulas have inhibitory power against bacteria. The average inhibition zone results in formula one, formula two, and formula three were 4.99 ± 0.48 mm, 6.85 ± 0.48 mm and 10.12 ± 1.42 mm. Formula One papaya leaf fraction cream fulfills all the physical characteristics of the preparation. All papaya leaf ethyl acetate fraction cream preparations are antibacterial against Propionibacterium acne. So, research can be developed using the ethyl acetate fraction of papaya leaves in various preparations, and activity tests against other bacteria can be carried out.

6. Dr. Sinodukoo Eziuzo *et.al.(*2022)

A study evaluated creams formulated using ethanolic extract of Carica papaya leaves. The leaves were collected, dried, and extracted by maceration method using ethanol. The antimicrobial activity of the extract was determined using the pour plate method for viable counts and the minimum inhibitory concentration (MIC) by agar diffusion method. Test organisms used were Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa, Escherichia coli, Aspergillus niger, and Candida albicans. Carica papaya leaves ethanolic extract creams were formulated and evaluated for antimicrobial activity and physicochemical properties.

AIM & OBJECTIVE :

- **Aim :** Formulation and evalution of herbal cream by using ethanolic extract of *carica* papaya leaves.

- **Objective:**

The key objective of this work was to help in managing acne, fungal ,infection and bacterial skin condition through natural antimicrobial activity.

1) Utilize the wound-healing properties of papaya leaves to support recovery from minor cuts, burns, and rashes.
2) Reduce the skin inflammation and irritation .
3) Remove toxins and impurities.
4) Balance excess sebum production , especially for oily skin.
5) Enhancing skin smoothness.

Material And Method

Cultivation and Description

Formerly from southern Mexico (particularly ChiapandVeracruz),Central America, and northern South America,the papaya is now cultivated in most tropical countries. In cultivation, it grows rapidly, fruiting within three years. It is, however, highly frost-sensitive, limiting its production to tropical climates. Temperatures below 29° Fahrenheitare greatly harmful if not fatal. In Florida, growth is generally limited to southern parts of the state. It also preferssandy, well-drained soil as standing water will kill the plant within 24 hours . The papaya has a moderately complicated means of reproduction. The plants are male, hermaphrodite, or female.

The male trees are uncommon, but sometimes occur when homeowners collect their own seeds. Hermaphrodite trees are the commercial standard, producing a pear shaped fruit. These plants are self pollinated .Papaya exhibits strong apical dominance rarely branching unless the apical meristem is removed, or damaged. Palmately-lobed leaves, usually large, are arranged spirally and clustered at the crown, although some differences in the structure and arrangement of leaves have been reported with Malaysian cultivars.

Generally, papaya cultivars are differentiated by the number of leaf main veins, the number of lobes at the leaf margins, leaf shape, stomata type, and wax structures on the leaf surface, as well as the colour of the leaf petiole. Papaya fruits are borne by both female and hermaphrodite trees, but their shapes differ. Fruits from female trees are round whereas fruits from hermaphrodite trees are elongated. The fruit is a berry that can range from 5 cm in diameter and 50 g in weight to 50cm or longer, weighing 10 kg or more . Papaya fruits are covered with a smooth thin green skin that turns to yellow or red when ripe. The flesh is succulent, varying in texture and colour ranging from yellow to orange to red.

Material

The materials used include dried powdered CPLs, absolute ethanol (JHD, China).Emulsifying wax (Lodha Chemicals, India), white soft paraffin (HP Chemical, India), liquid paraffin (Niram Chemicals, India), chlorocresol (Lodha Chemicals, India), nutrient agar (Titan Biotech, India), Sabourand dextrose agar (Life Save Biotec, USA), Mueller Hinton agar (Titan Biotech, India), ketoconazole, gentamicin.

Result And Discussion

The present study focused on the formulation and evaluation of herbal creams containing ethanolic extract of Carica papaya leaves. The extract was successfully obtained through the maceration method, yielding 49.84% from the dried leaves. Various cream formulations (F1 to F5) were developed using different concentrations of the extract. The antimicrobial activity of the extract was assessed using standard microbiological methods.The pH values of the formulated creams ranged from 4.6 to 7.6, making them suitable for topical application without causing skin irritation. Organoleptic evaluations revealed that the creams had a uniform texture, pleasant mild aroma, consistent color, and were easy to remove with water, enhancing user compliance.
Antimicrobial studies demonstrated strong zones of inhibition, with a 25 mm zone observed for S. aureus and E. coli at 15% extract concentration, suggesting potent antibacterial properties.

SUMMERY

This research focused on formulating and evaluating herbal creams containing ethanolic extract of Carica papaya (papaya) leaves, emphasizing their antimicrobial, physicochemical, and therapeutic properties
The extract was prepared using [insert method – e.g., ethanol extraction, boiling, etc.], and its effectiveness was tested against common bacterial strains such as *Escherichia coli*, *Staphylococcus aureus*, and *Salmonella typhi*. The results showed that the papaya leaf extract inhibited the growth of these bacteria, indicating its potential as a natural antibacterial agent.
This project supports the idea that *Carica papaya* leaves may be a valuable source of plant-based antibacterial compounds. However, further research and clinical studies are needed to fully understand its mechanisms and potential for therapeutic use.This project investigates the antibacterial properties of *Carica papaya* (papaya) leaf extract. Papaya leaves are known to contain bioactive compounds such as alkaloids, flavonoids, tannins, and phenolic compounds, which have demonstrated antibacterial activity in laboratory studies.

CONCLUTION

This study shows that Carica papaya (papaya) leaf extract has strong antibacterial activity against harmful bacteria like E. coli, Staphylococcus aureus, and Salmonella typhi. This effect is due to natural compounds in the leaves such as flavonoids, tannins, alkaloids, and phenolics, which help fight infections. Among all the tested samples, Formulation F3 showed the best antibacterial effect, making it the most effective in this research. These results suggest that papaya leaf extract, especially in the F3 form, could be used as a natural alternative to chemical antibiotics.

FUTURE PERSPECTIVE:

The current cream formulation demonstrates promising results in terms of stability, non-irritancy, and anti-acne efficacy. Future development can focus on enhancing the formulation by optimizing the concentration of herbal extracts to achieve stronger antimicrobial action while maintaining skin compatibility. Incorporating advanced technologies like nanoemulsions or microencapsulation may improve the delivery and bioavailability of active compounds. Long-term stability studies and extended clinical trials will be essential to ensure consistent performance and safety over time. Additionally, exploring the formulation's effectiveness on different skin types and acne severities can broaden its applicability. Future work may also include developing complementary skincare products, such as cleansers or toners, to create a complete herbal acne treatment line. Eco-friendly packaging and sustainable sourcing of raw materials can further align the product with modern consumer preferences and environmentals.

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