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# PREPARATION AND EVALUATION OF ANTI-SEPTIC GEL CUBE CONTAINING TRIDAX PROCUMBIN AND TURMERIC

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ABSTRACT :

In order to prevent infections, lessen inflammation, and encourage tissue regeneration, wound care is an essential component of healthcare. The antibacterial, anti-inflammatory, and antioxidant qualities of natural treatments made from medicinal plants like turmeric (Curcuma longa) and Tridax procumbens have drawn a lot of interest. The bioactive substances flavonoids, alkaloids, and tannins found in Tridax procumbens, sometimes referred to as coat button, aid in the plant's ability to heal wounds and fight off bacteria. Likewise, turmeric, which contains curcumin as its active component, has shown great promise in lowering inflammation, promoting the production of collagen, and preventing oxidative stress. The phytochemical components, extraction techniques, and pharmacological actions of these plants are all thoroughly examined in this paper. Their use in gel-based antiseptic cubes, a novel formulation intended to promote patient compliance, guarantee controlled release of active chemicals, and create a moist healing environment, is also covered. The creation of gel-based cubes, which offer portability, simplicity of use, and a lower risk of contamination, is an inventive approach to wound care that combines ancient herbal therapy with contemporary pharmaceutical procedures. By bridging the gap between modern drug delivery methods and conventional plant-based therapies, this paper hopes to advance sustainable and efficient wound care options.

**Keywords**: Tridax procumbens, Turmeric,Antiseptic,Anti-inflammatory, Gel based cube.

## Introduction :

Wound healing is a critical biological process that restores the skin's integrity after injury. Effective wound management requires a formulation that provides antimicrobial protection, anti-inflammatory action, and hydration to promote faster healing.[1,2,3] Traditional antiseptic creams and lotions often contain synthetic chemicals that may cause irritation or resistance over time. To overcome these challenges, the use of natural plant-based antiseptics has gained significant attention due to their safety, efficacy, and minimal side effects. [11,12,13]This project focuses on developing a gel-based antiseptic cube using Tridax procumbens and turmeric (Curcuma longa). These medicinal plants have been widely recognized in Ayurveda and modern research for their antimicrobial, anti-inflammatory, antioxidant, and wound-healing properties.[4,5,6,10]Tridax procumbens, commonly known as coat button, contains flavonoids, tannins, and alkaloids that exhibit antibacterial and wound-healing effects. It enhances collagen synthesis, reduces microbial infections, and accelerates skin repair.[14,15,18]Turmeric, known for its active compound curcumin, has strong antiseptic, anti-inflammatory, and antioxidant properties. It reduces swelling, fights infections, and promotes tissue regeneration.[5,6,9]The gel-based cube formulation offers several advantages over conventional antiseptic creams and lotions. It provides a controlled and sustained release of active ingredients, ensuring long-lasting protection. The cube dissolves gradually upon application, forming a hydrating gel layer that maintains a moist wound environment, which is essential for faster healing and scar reduction.This project aims to formulate and evaluate a novel gel-based antiseptic cube by optimizing its composition, stability, and antimicrobial activity. By integrating traditional herbal medicine with modern pharmaceutical technology, this innovative product offers a natural, effective, and user-friendly alternative for wound care and skin protection.

### A. Tridax Procumbens

**Synonyms** :- Tridax hispida, Tridax procumbens var. hispida, Bidens procumbens, Tridax coronopifolia

**Common Names :**

- English: Coat Button, Tridax Daisy
- Hindi: Jayanti veda
- Marathi: Dagadi Pala, Ghamra

**Biological Source** :- It is obtained from the whole aerial parts of the plant, including leaves, flowers, and stems. The plant is widely used for its antimicrobial, anti-inflammatory, and wound-healing properties.[16,18,17]

**Family** :- Asteraceae

**Chemical Constituents:**

Essential Oils: Camphor ,Curzerenone ,β-turmerone ,Ar-turmerone
Curcuminoids: ,Curcumin (main active ingredient) ,Demethoxycurcumin ,Bisdemethoxycurcumin ,Terpenoids: ,Cineole ,Linalool ,Polysaccharides and Alkaloids
USES**:-**

1. Wound Healing
2. Antiseptic & Antibacterial
3. Anti-Inflammatory
4. Blood Coagulant – Aids in blood clotting and helps control bleeding in minor injuries.
5. Liver Protection (Hepatoprotective) – Used in traditional medicine to detoxify the liver and protect it from damage.

**Tridax procumbens Powder**

**B. B) TURMERIC (CURCUMIN)**

**Synonyms** :- curcuma, curcuma aromatic , curcuma domestica, curcumae .
Common Names:-

1. English – Turmeric
2. Hindi – Haldi
3. Marathi – Halad
4. Sanskrit – Haridra

**Biological Source** :- The biological source of curcumin is the turmeric plant (Curcuma longa), a member of the Zingiberaceae family (ginger family). Curcumin is the main active compound found in the rhizomes (underground stems) of the turmeric plant. It is responsible for the yellow color of turmeric and is widely known for its potential medicinal properties, such as anti-inflammatory and antioxidant effects.[4,5,9,7,6]
**Family**:- Zingiberaceae
**Chemical Constituents**:
Curcuminoids: ,Curcumin (major bioactive compound) ,Demethoxycurcumin ,Bisdemethoxycurcumin ,Volatile Oils: ,Turmerone ,Ar-turmerone ,Zingiberene ,Polysaccharides:
Proteins and Resins: ,Turmeric starch

**Uses:-**

1. Antioxidant effects: It helps neutralize free radicals, protecting the body from oxidative stress.
2. Supports digestion: It can aid in digestion and relieve symptoms of indigestion or bloating.
3. Improves brain health: Some studies suggest turmeric can support cognitive function and protect against neurodegenerative diseases like Alzheimer's.
4. Heart health: It may reduce the risk of heart disease by improving blood vessel function and lowering cholesterol leves.

**Turmeric Powder**

## Ingredients For Gel-Based Antiseptic Cube :

**1. Active Ingredients (Herbal Extracts)**
Tridax procumbens extract – Antimicrobial, anti-inflammatory, and wound healing properties. Turmeric (Curcuma longa) extract – Contains curcumin, which has strong antiseptic, anti-inflammatory, and antioxidant effects.

**2. Gel-Forming Agents (Gelling Agents)**
Carbopol 940 or 934 – Used to create a stable gel structure. Xanthan gum or HPMC (Hydroxypropyl Methylcellulose) – Optional alternatives for gel consistency.

**3. Solvents**
Distilled water – Main solvent for dissolving ingredients. Ethanol (if needed for extraction) – Helps in extracting active compounds from plant materials. Glycerin – Acts as a humectant to retain moisture.

**4. Preservatives (Optional, for stability)**
Methylparaben & Propylparaben – Prevents microbial contamination.
Benzalkonium chloride – Antimicrobial preservative.

**6.pH Adjusters**
Sodium hydroxide (NaOH) or Triethanolamine (TEA) – Used to adjust pH for skin compatibility.

**6. Binding & Stabilizing Agents**
PEG (Polyethylene Glycol) or Propylene Glycol – Helps in uniform mixing and enhances skin penetration.

**7. Cooling & Soothing Agents (Optional)**
Aloe vera extract – Provides extra soothing and healing effects.
Menthol – Gives a cooling effect and relieves irritation.

***Advantages***

1. 1.Natural & Herbal-Based – Uses Tridax procumbens and Turmeric, reducing side effects compared to synthetic antiseptics.
2. Sustained Release – Gradual dissolution ensures long-lasting antimicrobial protection.
3. Easy to Apply – The gel-based cube melts on contact and spreads evenly on the skin.
4. Moist Wound Healing - Provides hydration, promoting faster tissue regeneration.
5. Portable & Convenient – Solid cube form is lightweight, easy to store, and mess-free.
6. Less Preservative Requirement – Compared to liquid gels, cubes require fewer chemical preservatives.

***Disadvantages:***

1. Temperature Sensitivity – High heat may soften or alter the cube's texture.
2. Dissolution Rate Variation – Factors like humidity and storage conditions can affect the melting rate.
3. Limited Market Availability – Gel-based antiseptic cubes are not common, so user adaptation may take time.
4. Requires Optimization – Need to balance hardness & dissolution for controlled drug release.
5. Higher Initial Development Cost – Research & formulation development require testing & refinement.

| **Sr.No.** | **Evaluation Parameters** | |
|---|---|---|
| 1. | Physical appearance | Color, texture, and clarity of the cube<br>Should be uniform, smooth, and visually appealing |
| 2. | pH Measurement | Should be in the range of 5.5 – 7.0 (skin-friendly pH) |
| 3. | Hardness & Gel Strength | Measures firmness of the cube<br>Ensures it maintains shape but dissolves easily on skin |
| 4. | Spreadability | Ensures smooth and even application without clumping |
| 5. | Dissolution & Disintegration Time | Time taken to dissolve upon contact with skin or water<br>Should provide gradual and sustained release |

| | | |
|---|---|---|
| 6 | Moisture Retention & Hydration Test | Assesses ability to keep the wound hydrated for faster healing |
| 7. | Antimicrobial Activity | Tested using agar well diffusion against bacteria (S. aureus, E. coli)<br>Should show strong antibacterial and antifungal properties |
| 8. | Stability Studies | Evaluated under different temperature & humidity conditions (25°C/60% RH & 40°C/75% RH)<br>Ensures long shelf-life & consistency |
| 9. | Drug Release Profile | Measures the release rate of Tridax & Turmeric extracts over time<br>Ensures sustained therapeutic action |
| 10. | Skin Irritation Test | Checked on human volunteers or models to ensure no irritation or redness |

## Conclusion :

The gel-based antiseptic cube formulated using Tridax procumbens and Turmeric (Curcuma longa) is an innovative approach to wound care. This formulation provides natural antimicrobial, anti-inflammatory, and wound-healing benefits while ensuring hydration and sustained drug release. The cube form offers easy application, portability, and reduced contamination risks compared to traditional creams or liquids.

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