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EXPLORING THE PHARMACOGNOSTIC PROFILE OF CANISTEL A VALUABLE SOURCE OF ANTIOXIDANT

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ABSTRACT: The fruit, native to Central America, is known for its unique appearance and rich nutritional content. This profile includes an examination of the plant's macroscopic and microscopic features of fruit anatomy. A significant focus is placed on the phytochemical constituents of *Canistel*, which include alkaloids, flavonoids, tannins, and terpenoids. These compounds associated with various biological activities. The bioactive substances contribute to the plant's antioxidant property suggesting its therapeutic potential in traditional medicine. Also the plant's role in managing conditions like diabetes, hypertension, and digestive disorders has been documented in traditional medicine. The pharmacognostic profile also includes the plant's pharmacological properties, which support its use in the development of natural health products. The canistel is egg-shaped fruit and sweet, dense pulp Microscopically, the plant's cellular structures, such as Parenchyma cells, Vascular Tissues, Fibres and vascular bundles, This detailed anatomical study helps in ensuring the authenticity and quality of the plant material used in medicinal applications. The plant's medicinal uses also support its potential therapeutic value, as it has been utilized for treating digestive issues, fever, and wounds. In addition, research into the fruit's nutritional value has highlighted its rich content of vitamins and minerals, further supporting its health benefits. This pharmacognostic profile shows the importance of Canistel as a promising natural remedy. By compiling data on its botanical characteristics, chemical constituents, and pharmacological properties, the review aims to establish a solid foundation for future research. The findings may help promote Canistel's integration into modern healthcare, offering new opportunities for the development of natural health products.

INTRODUCTION: The pharmacognostic profile of Canistel (*Pouteria campechiana*) is a fascinating topic that highlights its potential as a valuable source of antioxidants. Canistel, commonly known as the "eggfruit," is a tropical fruit native to Central america but now cultivated in various parts of the world. Despite its relatively low profile in the global food industry, this fruit has garnered increasing attention for its rich nutritional content, particularly its antioxidant properties [1].

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Biological Source: The biological source of *Pouteria campechiana* is the plant species commonly known as canistel or eggfruit. It belongs to the family Sapotaceae, which is a family of tropical trees and shrubs.

Geographical Source: This species is native to southern Mexico and Central America but is also cultivated in other tropical and subtropical regions [2].

Cultivation and Collection: Canistel (*Pouteria campechiana*) thrives in tropical climates with well-drained, slightly acidic soil and moderate rainfall. It is typically propagated through seeds or grafting, with trees spaced 10-15 meters apart [3]. Regular watering and organic fertilization promote

healthy growth, while pruning helps shape the tree and improve air circulation [4]. The tree flowers in spring and bears fruit 3-4 months later. Canistel fruit is harvested when it turns golden yellow, feels slightly soft, and is collected by hand to avoid damage. The fruit has a short shelf life and should be consumed quickly or stored in refrigeration for limited periods [5].

Morphological Characters: This plant originating from Mexico that can grow in tropical and subtropical climates but in Indonesia, it is found in many areas of West Java and it is relatively cheap. And it can now be found in many countries such as Sri Lanka, Philippines, Vietnam and Thailand. Research studies focused on describing the morphological characteristics of fruits and leaves from trees found in various regions of Mexico, aiming to identify exemplary specimens for mass reproduction [6]. The canistel is a medium-sized evergreen tree that originates from Central and South America and is cultivated for its edible fruit. This tree can reach heights of up to 50 feet, although it typically grows to about 8 meters. Its leaves are evergreen, obovate-elliptic in shape, and taper at the ends. The canistel produces small, fragrant, bell-shaped flowers that are cream-colored, featuring five sepals, five or six lobed petals, five stamens, and a single ovary. The fruit itself is either spindle-shaped or round and obovate, with a pointed tip [7]. It has an orange-yellow hue and a texture reminiscent of the yolk from a hard-boiled egg. The mature bark is light brown, furrowed, contains latex, and has branches that spread out. The roots of fully-grown canistel trees extend beyond the drip line of their canopy [8].

A fruit that reaches full maturity showcases a deep yellow skin color. Eventually, it becomes soft and falls from the tree. Insects and birds tend to steer clear of the flesh, likely due to its astringent qualities, which significantly diminish in older fruits but remain noticeable to humans. Fruits that are picked while still firm may not undergo the necessary climacteric changes, resulting in persistent stringency and a texture similar to that of egg yolk [9].

FIG. 1: FRUITS OF *POUTERIA CAMPECHIANA*

FIG. 2: *POUTERIA CAMPECHIANA* (TREE)

FIG. 3: *POUTERIA CAMPECHIANA* (TREE)

FIG. 4: BRANCHES OF POUTERIA *CAMPECHIANA*

FIG. 5: LEAVES OF SEEDS OF *POUTERIA CAMPECHIANA*

Microscopical Characters:

Powder Microscopy: Microscopically, the canistel's flesh consists of densely packed parenchyma cells, which are large and polygonal in shape, filled with a golden yellow, starch-rich cytoplasm. These cells have thin, cellulose-based walls, contributing to the smooth, creamy texture of the fruit [10]. The vascular tissue, consisting of xylem and phloem, is scattered throughout, but its presence is less prominent compared to the abundant parenchyma. The fruit's cells contain small starch granules, giving the flesh its custard-like consistency. Additionally, the outer skin contains an epidermal layer made up of compact, rectangular cells covered by a waxy cuticle. The seed, encased in a hard, lignified coat, contains an embryo and endosperm, visible under the microscope as densely packed cells with stored nutrients [11].

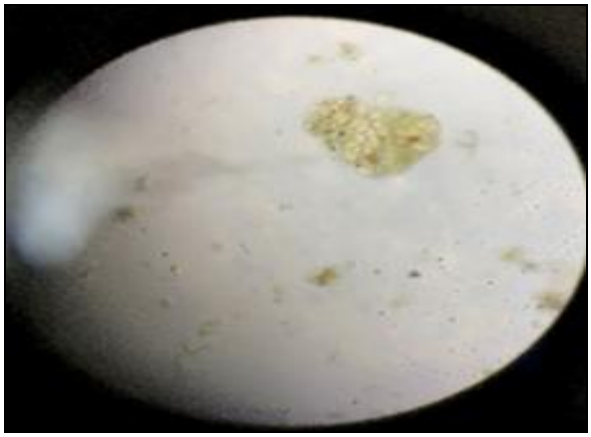

FIG. 6: PARENCHYMA CELLS

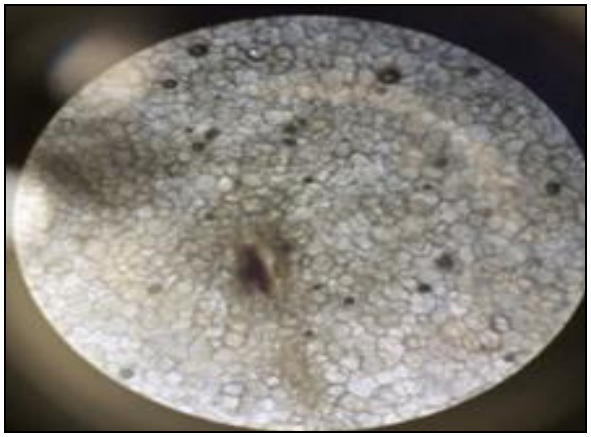

FIG. 7: VASCULAR TISSUES

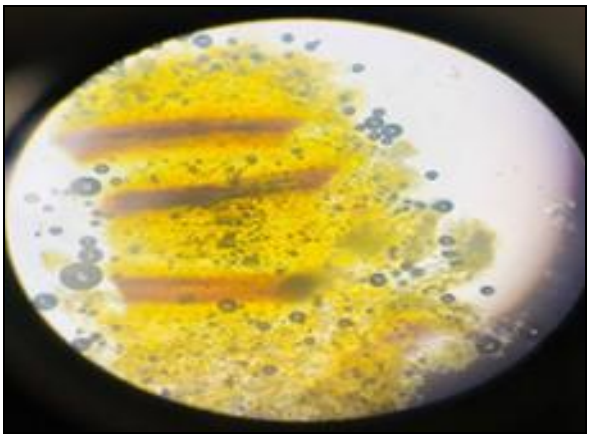

FIG. 8: FIBRES

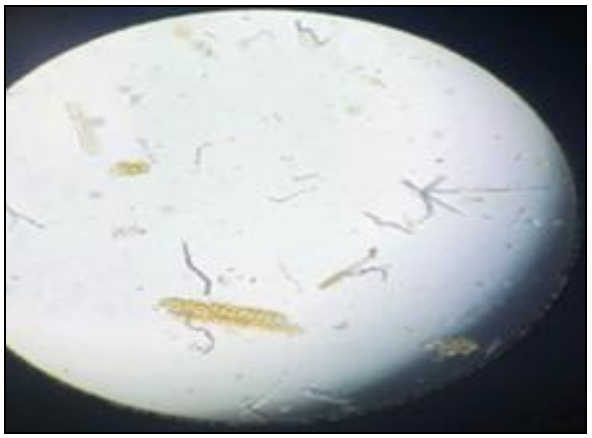

FIG. 9: VASCULAR BUNDLES

Chemical Constituents: Carbohydrates, amino acids, carotene, phenols, flavonoids, carotenoids, vitamin A and C, minerals such as calcium, phosphorous and iron [12].

Pharmacological Uses: The canistel fruit, seeds and leaves having antioxidant activity [13]. The ethanol extracts of these seeds and leaves are used as some medicines such as gallate acid, anti-inflammatory properties and are useful in treating gastrointestinal disorders [14]. The canistel fruit also having some property as a remedy for liver disorders, epilepsy and coronary trouble, also the leaves and bark have the ability to treat fever and skin blisters [15].

Adulterant:

Artificial Ripening Agents:

Calcium Carbide: Often used to artificially ripen fruits, including canistel, despite being illegal in many countries. Calcium carbide contains traces of arsenic and phosphorus, which are harmful to health.

Ethylene Gas (Synthetic): A safer but still sometimes misused ripening agent that speeds up the ripening process.

Coloring Agents:

Synthetic Dyes: Bright yellow or orange dyes (e.g., metanil yellow) might be applied to enhance the fruit's natural appearance, making it look fresher or more appealing.

Coating Agents:

Wax Coatings: Fruits may be coated with non-food-grade wax to improve their shine and extend shelf life. These waxes can be harmful if not food-grade

Pesticide Residues:

Excessive Use of Pesticides: Fruits might retain harmful pesticide residues if not washed properly or if farmers overuse chemicals during cultivation.

Inferior:

Substituting Inferior Varieties: Lower-quality or damaged canistel fruits may be mixed with high-quality ones to deceive buyers.

Blending with Other Pulp: In processed forms like purees or jams, other cheaper fruit pulps (e.g., pumpkin) might be mixed and sold as pure canistel products [16].

Marketed Formulations: In terms of marketed formulations, canistel is not as widely found in mass-produced consumer products as more common fruits, but there are some key formulations or products that may feature it, especially in tropical regions or in niche markets:

Frozen Canistel Pulp: In some tropical regions, canistel is harvested, peeled, and then frozen in pulp form for easy use. This pulp can be used to prepare smoothies, ice creams, or desserts, where the creamy texture of the fruit is a main ingredient.

Canistel Jam: Canistel is sometimes processed into jams, jellies, or preserves. The natural sweetness and smooth consistency make it a good candidate for fruit spreads, and it's sometimes marketed alongside other tropical fruit jams [17].

Canistel Powder: In some regions, canistel is dried and ground into powder or flour. This powder can be added to smoothies, baked goods, or used as a supplement for its nutritional benefits. It may be marketed in health food stores or niche markets focused on alternative ingredients [18].

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CONFLICT OF INTEREST: Nil

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