Pharmacological Review of Pouteria Campechiana

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***Abstract*: Pouteria campechiana, commonly known as canistel or eggfruit, is a tropical evergreen tree native to southern Mexico and Guatemala. It produces bright yellow-orange fruits with a sweet, creamy flesh reminiscent of a hard-boiled egg yolk, making it a unique addition to the Sapotaceae family. It contains significant amounts of dietary fiber, calcium, phosphorus, and iron. The pulp is particularly notable for its high carotenoid content, including β-carotene, lutein, and violaxanthin, which contribute to its vibrant color and potential pro-vitamin A activity. Phytochemically, P. campechiana is abundant in secondary metabolites such as phenols, flavonoids, tannins, and alkaloids. Studies have identified compounds like quercetin, myricetin, gallic acid, and protocatechuic acid in its leaves and seeds, contributing to its antioxidant and anti-inflammatory properties. Pharmacologically, the plant exhibits a range of biological activities. Its fruit pulp and peel have demonstrated significant antioxidant capacities. This study investigates its phytochemical composition and pharmacological properties to assess its potential as a natural therapeutic agent. The antioxidant activity was evaluated neuroprotective and antioxidant activity, demonstrating notable free radical scavenging abilities . These findings underscore the therapeutic potential of Pouteria campechiana and support its traditional medicinal uses. Further research is warranted to isolate specific compounds and elucidate their mechanisms of action for potential development into natural remedies. In summary, pouteria campechiana is a nutritionally rich fruit with diverse pharmacological properties, making it a valuable candidate for further research and potential therapeutic applications.**

***Keywords*: Pouteria Campechiana, canistel, antioxidant, anti-inflammatory, phytochemical constituents.**

1. Introduction

Pouteria campechiana, commonly known as canistel or eggfruit, is a tropical evergreen tree native to southern Mexico, Belize, Guatemala, and El Salvador. Belonging to the Sapotaceae family, it is now cultivated in various tropical and subtropical regions worldwide. The tree produces ovoid, bright yellow fruits with a firm, custard-like pulp, often compared to the texture of a hard-boiled egg yolk. Phytochemical studies reveal that Pouteria campechiana is a rich source of bioactive compounds such as carotenoids, flavonoids, saponins, and phenolic acids, which contribute to its antioxidant, antimicrobial, and potential anti-inflammatory activities. Traditionally, various parts of the plant have been used in folk medicine for treating skin conditions, digestive disorders, and respiratory problems. The increasing interest in plant-based therapeutics highlights the need for in-depth pharmacognostical and phytochemical evaluation of underutilized species like Pouteria campechiana. This project aims to provide a comprehensive overview of its botanical characteristics, phytoconstituents, traditional uses, and potential pharmacological activities, thus supporting its relevance in pharmaceutical research and development.

Fig. 1. Pouteria campechiana

The *Pouteria campechiana*, belongs to the Kingdom Plantae, indicating its classification as a plant. Within the plant kingdom, it is categorized under the Phylum Magnoliophyta, which encompasses flowering plants. Further narrowing its classification, the canistel is placed in the Class Magnoliopsida, a group commonly referred to as dicotyledons. Its order is Ericales, and it is a member of the Family Sapotaceae, which is known for its fruit-bearing trees. Finally, its genus is *Pouteria*, with the specific species being *Pouteria campechiana*. Pharmacognostical studies of Pouteria campechiana have been carried out, including literature surveys on several Pouteria species. Botanical studies, including macro- and micro-morphological characters of the plant organs, have been presented for their identification in the entire or powdered

forms. The evaluation of the physiochemical and phytochemical parameters helps in the identification, authentication, and safety of medicinal plants. Secondary metabolites of Pouteria campechiana have been analysed, such as phenol, flavonoid, tannin, and alkaloids. The fruit of Pouteria campechiana is reported as a rich source of carotenoids and is well known for its antioxidant and hepatoprotective properties. Parts of this plant have been used in traditional medicine for centuries. Unripe fruit is taken for controlling diarrhoea. The fruit is a rich source of carbohydrates, dietary fiber, protein, fat, and vitamins including C, A, and B-group vitamins. Minerals contained in the fruit include potassium, sodium, calcium, magnesium, phosphorus, copper, iron, manganese, and zinc. The weight, size, and organic acid content of the fruit vary depending on the growing area. The total organic acid content, comprising tartaric acid, malic acid, citric acid, and Gallic acid, decreases during storage at room temperature.[3]

The pulp of the fruits was oven-dried at 105°C until constant weight prior to analysis for its macronutrients, sugar, and vitamin C profile. It has been reported that it can be cultivated in tropical and subtropical climates and is well adapted to a wide range of soil conditions with moderate precipitation. The leaves and tree bark are also found to be useful. Studies have compared canistel's nutritional composition to other fruits, noting its high vitamin C content and relatively low energy and total sugar levels. Modern studies explore the fruit's pharmacological properties, including its potential for treating conditions like diabetes, hypertension, and digestive disorders.Pouteria campechiana, commonly known as canistel or eggfruit, can be propagated through both sexual and asexual methods. The most common method is by seeds, which should be planted fresh due to their short viability period. Seedlings typically take several years to bear fruit, often between 3 to 6 years. For faster fruiting and to ensure desirable traits, asexual propagation methods such as grafting, budding, or air layering are preferred. Grafting onto seedling rootstocks is particularly effective and widely used by commercial growers to maintain cultivar quality. These vegetative techniques also help ensure uniformity in fruit production and growth characteristics.[4]

2. Pharmacological Activity

The joel et al. (May 2020) conducted study concludes that *Pouteria campechiana* exhibits significant neuroprotective potential in aluminum-chloride-induced Alzheimer's model rats. Administration of the plant's fruit powder or ethanolic extract not only enhanced cognitive performance and reduced oxidative stress, but also restored cholinergic enzyme activity and markedly reduced hallmark Alzheimer's neuropathology—ultimately demonstrating promising therapeutic benefits in this preclinical model.[5]

The Pai et al. (2020) conducts a study provides a comprehensive analysis of the physicochemical, phytochemical, and GC–MS profiles of *Pouteria campechiana* leaves and fruits. Physicochemical evaluations revealed that the total ash content was higher in the leaves compared to the fruits. The water-soluble ash value was greater in the fruit, whereas the acid-soluble ash value was higher in the leaves. Additionally, the water-extractable value surpassed the alcohol-extractable value in both leaves and fruits. Moisture content, swelling index, and foaming index were found to be greater in the leaves than in the fruits. Phytochemical screening identified the presence of various bioactive compounds. Quantitative analysis revealed that the leaf extract contained higher levels of phenolic compounds, flavonoids, and tannins compared to the fruit extract. Conversely, the fruit extract had a higher total alkaloid content than the leaf extract. GC–MS analysis of the methanolic extracts identified 9 compounds in the leaf and 12 compounds in the fruit. These findings underscore the rich phytopharmaceutical potential of *Pouteria campechiana* and provide a valuable analytical framework for its standardization and traditional use.[1]

The study by Elsayed et al. (2016) investigated the chemical composition and biological activities of *Pouteria campechiana* (Kunth) Baehni, focusing on its leaves and seeds. The research identified six bioactive compounds: protocatechuic acid, gallic acid, quercetin, myricetin, myricetin-3-O-α-L-rhamnoside, and myricetin-3-O-β-galactoside. These compounds are associated with the plant's pharmacological effects. The study also evaluated the plant's analgesic, anti-inflammatory, and gastroprotective activities. The ethanolic extract of the seeds demonstrated 85% inhibition of inflammation in the rat paw oedema test at a dose of 100 mg/kg after 4 hours. The leaves' ethanolic extract exhibited significant analgesic activity in the hot plate test at a dose of 200 mg/kg. Both leaves and seeds ethanolic extracts showed significant decreases in gastric ulcer number and severity, indicating gastroprotective effects. These findings suggest that *Pouteria campechiana* possesses notable pharmacological properties, which may be attributed to its phenolic and flavonoid content.[8]

3. Result and Discussion

Canistel (Pouteria campechiana), also known as eggfruit or yellow sapote, is a tropical fruit native to southern Mexico and Central America. It has gained attention for its rich nutritional profile and potential health benefits. The fruit contains various bioactive compounds, including alkaloids, tannins, phenols, and flavonoids, which contribute to its antioxidant, anti-inflammatory, antibacterial, and anti-ulcer properties. Additionally, canistel is rich in carbohydrates, vitamin C, vitamin B complex, and minerals such as calcium, phosphorus, and iron, supporting immune function, digestive health, and overall vitality. Studies have highlighted several pharmacological properties of canistel, including antioxidant, anti-inflammatory, antibacterial, anti-ulcer, hepatoprotective, and anti-diabetic activities. In traditional medicine, various parts of the canistel tree are utilized: the bark is used as a febrifuge and for treating skin eruptions, seeds are employed in preparations for treating ulcers, and the fruit is consumed for its nutritional benefits and medicinal properties. While native to Central America, canistel is now cultivated in various tropical

and subtropical regions, including parts of India, Brazil, the Philippines, and Vietnam. Its adaptability to different climates has contributed to its spread and cultivation worldwide. In conclusion, canistel is a nutritionally rich fruit with a range of bioactive compounds that support various health benefits. Its traditional uses in treating ailments, combined with its growing global cultivation, underscore its significance in both nutrition and traditional medicine.

4. Conclusion

Pouteria campechiana, commonly known as canistel, is a tropical fruit-bearing tree native to Central America and the Caribbean. Extensive phytochemical analyses have identified over 180 bioactive compounds across various plant parts, including the fruit, leaves, seeds, and bark. These compounds encompass phenolic acids (e.g., ferulic acid, hopeaphenol), flavonoids (such as quercetin, rutin, and apigenin), carotenoids (notably β-carotene and lutein), triterpenoids (e.g., oleanolic acid), and polysaccharides. Pharmacologically, P. campechiana demonstrates a broad spectrum of therapeutic activities. Its fruit extracts exhibit potent antioxidant properties, effectively scavenging free radicals and mitigating oxidative stress. Notably, the fruit extract has shown hepatoprotective effects in animal models, reducing liver enzyme levels and enhancing antioxidant enzyme activity in acetaminophen-induced liver toxicity. In conclusion, P. campechiana is a promising source of natural bioactive compounds with diverse pharmacological activities. Its rich phytochemical profile and multifaceted therapeutic effects warrant further research to explore its potential in pharmaceutical and nutraceutical applications.

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