

A REVIEW: PHYTOCHEMICAL AND PHARMACOLOGICAL EVALUATION OF *MANILKARA ZAPOTA* PLANTS

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ABSTRACT

Nature has blessed us with a wonderful diversity of flora and fauna that enriches and beautifies human life. Among these natural gifts is sapodilla, a sweet and nutritious fruit known for its pleasant taste and valuable medicinal properties. Sapodilla is recognized by different names across the world, such as Chikoo in India, Sapoti in Brazil, Lamoot in Thailand, Nesberry in the West Indies, and Sawu in Indonesia. Sapodilla is one of the major fruit crops cultivated in India and is an important member of the Sapotaceae family. The plant is rich in a wide range of phytoconstituents, including tannins, flavonoids, alkaloids, phenols, steroids, glycosides, carbohydrates, amino acids, minerals, triterpenoids, and fixed oils. Several scientific studies have reported that sapodilla

possesses numerous pharmacological activities, such as antioxidant, antimicrobial, anti-arthritic, anti-inflammatory, and antidiarrheal effects. Therefore, this review aims to summarize the phytochemical composition and pharmacological potential of sapodilla, which may serve as a valuable reference for future scientific research and therapeutic exploration of this plant.

KEYWORD: Sapodilla, Phytoconstituents, Pharmacological activities, Traditional uses.

INTRODUCTION

Nature has blessed us with a wonderful fauna and flora, which has made our life beautiful. One of these miracles is a sapodilla fruit. The Sapotaceae family includes about 800 species

and shrubs in around 65 genera.^[1] The scientific name Sapodilla is *Manilkara zapota*, belonging in to Family Sapotaceae. The fruit sapodilla is commonly known as chickoo, sapota, Nasebery. It possesses tremendous nutritional value. Sapodilla is regarded as natural energy booster as it contains sucrose, fructose.^[2] Sapodilla has its origin in Mexico and is Sapodilla is native to Central America, but it is widely cultivated in many Asian countries, including India. In India, the total area under sapota cultivation is approximately 162 thousand hectares, with an annual production of around 1358 thousand tonnes. Sapodilla is considered a nutritious fruit and is a good source of dietary fiber and energy, providing about 83 calories per 100 g of edible portion.^[3]

The fruit is also rich in several essential minerals, such as iron, magnesium, calcium, phosphorus, copper, and potassium, which contribute to its nutritional value. In addition, sapodilla contains a wide variety of bioactive chemical compounds, including phenolic compounds, terpenes, steroids, saponins, fixed oils, hydrocarbons, carbohydrates, and amino acids.^[4]

Several phytochemical constituents have been identified in the plant, such as myricetin-3-O- α -L-rhamnoside, saponins, β -carotene, and ascorbic acid, which are known for their potential medicinal and therapeutic benefits. Moreover, different parts of the plant are traditionally used as home remedies for the treatment of various health conditions. In folk medicine, sapodilla is used in the management of pain, inflammation, cough, fever, diarrhea, and dysentery. It is also believed to possess diuretic and tonic properties and may help prevent the formation of kidney and bladder stones.^[5-19]



Fig. 01: *Manilkara Zapota Plants.*

Table I: Taxonomical Classification of *Manilkara zapota*.

Kingdom	Plantae (plant)
Sub kingdom	Tracheobionta (vascular Plant)
Super Division	Suprmatophyta (seed Plant)
Division	Magnoliophyta (flowering Plant)
Class	Magnoliopsida (Dicotyledanae)
Sub-class	Dilleniidae
Order	Ebenales
Family	Sapotaceae
Genus	Manilkara Adans (manilkara)
Species	M.Zapota

Phytochemical Table of *Manilkara zapota*^[6]

Plant Part	Phytochemical Constituents	Chemical Class	Reported Biological Activity
Fruit	β -Carotene, Ascorbic acid (Vitamin C), Sugars	Carotenoids, Vitamins, Carbohydrates	Antioxidant, Nutritional value
Fruit Pulp	Glucose, Fructose, Sucrose	Carbohydrates	Energy source
Leaves	Myricetin-3-O- α -L-rhamnoside, Quercetin	Flavonoids	Antioxidant, Anti-inflammatory
Leaves	Tannins	Polyphenols	Antimicrobial, Anti-ulcer
Bark	Saponins	Glycosides	Anti-inflammatory, Antimicrobial
Bark	Triterpenoids	Terpenoids	Anti-ulcer, Hepatoprotective
Seeds	Fixed oils	Lipids	Antioxidant
Seeds	Saponins	Glycosides	Antimicrobial
Whole Plant	Phenolic compounds	Polyphenols	Antioxidant
Whole Plant	Alkaloids	Nitrogenous compounds	Pharmacological activity
Whole Plant	Steroids	Steroidal compounds	Anti-inflammatory
Whole Plant	Terpenes	Terpenoids	Antimicrobial

Traditional uses^[7-8]

- Sapodilla is also used for many indigenous medicines. Because of the tannin content, young fruits are boiled and the decoction taken to stop diarrhoea.
- An infusion of the young fruits and the flowers is drunk to relieve pulmonary complaints.
- A decoction of old, yellowed leaves is drunk as a remedy for coughs, colds and diarrhea.
- The crushed seeds have a diuretic action and are claimed to expel bladder and kidney stones.

- A fluid extract of the crushed seeds is employed in Yucatan as a sedative and soporific.
- A combined decoction of Sapodilla and chayote leaves is sweetened and taken daily to lower blood pressure.
- A paste of the seeds is applied on stings and bites from venomous animals.
- The latex is used in the tropics as a crude filling for tooth cavities. Fruit soaked in melted butter overnight, is thought to be preventive for biliousness and fevers.
- Seeds are antipyretic, and when ground with water they act as a diuretic. The plant is a source of saponin, a glucoside used in medicine as a febrifuge.

Pharmacological Activities

Anti-inflammatory and Anti-Pyretic Activities: The purpose of the study was to evaluate the anti-inflammatory and antipyretic potential of the ethanolic extract of *Manilkara zapota* leaves and its various solvent-soluble fractions using experimental albino Wistar rats. The anti-inflammatory activity was assessed using the carrageenan-induced paw edema model, which is a widely accepted method for evaluating inflammation. Additionally, the antipyretic activity was evaluated using the yeast-induced pyrexia model in albino Wistar rats.

Antidiarrheal activity: Scientific investigations on *M. zapota* have reclaimed its traditionally recognized efficacy in diarrhoea. In a study, the antidiarrheal activity of *M. zapota* bark ethanolic extract was demonstrated against castor oil induced diarrhoea in mice. Treatment with the bark extract reduced fecal output by 29.31% and 41.37%, at 250 mg/kg and 500 mg/kg doses, respectively.^[9]

Antibacterial activity: *M. zapota* has shown antibacterial activity against a range of clinically important Gram-positive and Gram-negative bacteria. Methanolic leaf extract of *M. zapota* exhibited moderate inhibitory effect against *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Mucilaginibacter flavus*, *Pseudomonas pseudoalcaligenes*, *Enterobacter aerogenes*, *Morganella morganii*, *Alcaligenes fecalis* and *Klebsiella pneumonia*, as determined by agar well diffusion assay.^[13]

Antioxidant Activities: Antioxidants are the chemical compounds that act on oxidation chain reactions by inhibiting or delaying the oxidation of other molecules. Antioxidants protect the human body from harmful effects of free radicals and ROS (Reactive Oxygen Species) Almost all the medicinal plants contain several antioxidants such as carotenoids, flavonoids (flavones, isoflavones, flavonones, anthocyanins), polyphenols (ellagic acid, gallic acid,

tannins), saponins, enzymes, vitamins (A, C, E, K) and minerals (copper, manganese, zinc, chromium, iodine, etc).^[20] Natural antioxidants are safer than synthesized antioxidants and they show anti-viral, anti-inflammatory, anti-cancer, anti-mutagenic, anti-tumour and hepatoprotective properties. These natural antioxidants are produced in all or any part of plants but mostly leaves are considered as the main source for their synthesis.^[14-09]

Anti-arthritis Activity: studied anti-arthritis effect of ethanolic extract of *Manilkara zapota* using in-vitro inhibition of protein denaturation model and found significant protection against denaturation of proteins suggesting the potential use of *Manilkara* as anti-arthritis agent.^[5]

Antimicrobial Activity: The objective of the present investigation was to evaluate the antibacterial activity of *Manilkara zapota*. Ethyl acetate extracts obtained from the stem bark and leaves of *Manilkara zapota* were subjected to bioassays to determine their antimicrobial potential against a variety of pathogenic bacteria and fungi.

The thin layer chromatography (TLC) analysis of the extracts indicated the presence of several phytochemical constituents, including flavonoids, glycosides, and terpenoids. The ethyl acetate extract of the stem bark exhibited notable antimicrobial activity against the tested microorganisms, producing zones of inhibition ranging from 8 to 16 mm. The tested organisms included *Aspergillus flavus*, *Fusarium sp.*, *Salmonella typhi*, *Bacillus subtilis*, *Bacillus megaterium*, *Sarcina lutea*, and *Escherichia coli*. Similarly, the ethyl acetate extract of the leaves showed moderate inhibitory activity against these pathogenic microorganisms, indicating the potential of *Manilkara zapota* as a source of natural antimicrobial agents.^[17]

CONCLUSION

From the above review, it can be concluded that nature has provided a rich diversity of flora and fauna that significantly contributes to human health and well-being. Among these natural resources, sapodilla (*Manilkara zapota*) is an important fruit known for its nutritional and medicinal value, although it has a relatively short shelf life.

The pharmacological properties of sapodilla are mainly attributed to the presence of various bioactive chemical constituents, such as polyphenols, ascorbic acid, glycosides (including sapotinin), carbohydrates, minerals, amino acids, and saponins. These phytochemicals contribute to a wide range of biological and therapeutic activities.

Various studies have demonstrated that different parts of the sapodilla plant exhibit several pharmacological effects, including antioxidant, antimicrobial, antiarthritic, anti-inflammatory, and antidiarrheal activities.

Therefore, *Manilkara zapota* can be considered a promising natural source of bioactive compounds, and further scientific investigations may help in exploring its potential for the development of novel therapeutic agents.

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