

***Pometia pinnata*: A REVIEW OF PHARMACOLOGICAL STUDIES**

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ABSTRACT

Traditional medicine extensively employs *Pometia pinnata*, a fruit native to Papua, Indonesia. Tannins, phenolics, and triterpenoid sterols make up the phytochemical content of this plant's flesh. At present, numerous studies have demonstrated that *P. pinnata* possesses a variety of pharmacological properties, such as antioxidant, antibacterial, anti-inflammatory, anti-obesity, antidiabetic, analgesic, and hepatoprotective properties. No comprehensive evaluation report has yet demonstrated the efficacy of the *P. pinnata* plant. Consequently, this review article will examine the plant's potential pharmacological activity.

KEYWORDS: *Pometia pinnata*, Antioxidant, Antibacterial, Anti-inflammatory, Anti-obesity, Antidiabetic, Analgesic, Hepatoprotective.

INTRODUCTION

People have used medicinal plants as tools to treat acute and chronic diseases since ancient times.^[1] Researchers have identified over 300 plants as having therapeutic potential.^[2] The use of medicinal plants is on the rise globally, and it is the preferred treatment for a variety of ailments because it has the fewest adverse effects.^[3,4] *Pometia pinnata* is extensively distributed throughout Southeast Asia, South Asia, and Melanesia. *P. pinnata* plants are classified as large, with an average height of 18 m and a maximum average diameter of 100 cm. This plant typically produces fruit annually. Typically, this type of plant produces flowers from July to October and fruit three to four months later. Nearly all lowland regions, with an elevation of approximately 1200 m above sea level, host the fruit of *P. pinnata*. Regions with a thick layer of soil and dry, non-flooded soil are ideal for this plant's growth. *P. pinnata*'s fruit is characterized by its sweetness.^[5] Researchers have reported numerous antioxidant, antibacterial, anti-inflammatory, anti-obesity, antidiabetic, analgesic, and hepatoprotective properties for *P. pinnata*. No comprehensive evaluation report has yet demonstrated the efficacy of the *P. pinnata* plant. Consequently, this review article will examine the plant's potential pharmacological activity.

TAXONOMIC CLASSIFICATION

Kingdom : Plantae
Order : Sapindales
Family : Sapindaceae

Genus : *Pometia*
Species : *Pometia pinnata*

PHARMACOLOGICAL STUDIES**Antioxidant**

Free radicals are molecules that become unstable and attempt to reclaim electrons from other molecules or cells as a result of losing energy.^[6,7] Highly reactive, free radicals engage in destructive oxidation reactions with specific body parts and cells composed of protein, fat, DNA, carbohydrates, and RNA. This interaction will result in the development of a variety of chronic degenerative diseases, such as aging, cancer, and coronary heart disease.^[8,9] Antioxidants are compounds that have the ability to safeguard cells from the harm caused by free radicals.^[10] Antioxidants interact by stabilizing free radicals, thereby preventing damage from potential free radicals. Plants, including fruits, vegetables, and tea, can yield natural antioxidants, a collection of polyphenolic compounds. Researchers reported that *P. pinnata* administration in the DPPH model exhibited potent antioxidant activity, with an IC₅₀ of 41.83 mg/mL.^[11]

Antibacterial

Since their introduction, antibiotics have provided numerous health-related benefits to the human quality of life and are one of our most critical weapons in the fight against bacterial infections. However, the emergence of drug-resistant bacteria and the increased ineffectiveness

of commonly used antibiotics against specific diseases have jeopardized these health advantages in recent decades.^[12] This is primarily because many of these antibiotics cause toxic reactions. Natural source medicines significantly influence the prevention and treatment of human diseases. Natural products containing higher levels of plants may yield novel antimicrobial agents with potentially novel mechanisms of action.^[13] Researchers reported that the administration of *P. pinnata* extract at concentrations of 12.5, 25, 50, 100, and 200 mg/mL inhibited bacteria such as *Pseudomonas aeruginosa* and *Staphylococcus aureus*.^[11]

Anti-inflammatory

Physical agents, bacterial, viral, or fungal infections, or a defective immune response typically initiate inflammation and cause damage to living tissue. A variety of non-steroidal anti-inflammatory drugs can alleviate pain and inflammation by inhibiting arachidonic acid metabolism by cyclooxygenase enzyme isoforms (COX-1 and/or COX-2), thereby reducing prostaglandin production. Regrettably, the administration of non-steroidal anti-inflammatory drugs is associated with numerous adverse effects.^[14] Nevertheless, there are medicinal plants that exhibit anti-inflammatory therapeutic effects with minimal or no side effects.^[15] Oral administration of *P. pinnata* extract at doses of 200, 400, and 800 mg/kg reduced carrageenan-induced inflammation in mice.^[16]

Anti-obesity

Obesity is characterized by an imbalance between energy intake and consumption, which results in abnormal body weight and excess fat accumulation. A body mass index of 25–30 and less than 30, respectively, indicates overweight and obesity. Non-communicable diseases, such as type 2 diabetes, hypertension, heart disease, stroke, osteoarthritis, non-alcoholic steatohepatitis, and various types of cancer, are all attributable to obesity. Over the past two and a half decades, scientists and researchers have concentrated on the discovery of anti-obesity agents with minimal side effects in order to develop safe and reliable treatments. These agents include phytochemicals from plant foods and herbs.^[17,18] Oral administration of *P. pinnata* extract at a dose of 3% (w/w) decreased body weight, visceral fat, serum triglyceride levels, and liver lipid content in a rat model fed a high-fat diet.^[19]

Antidiabetic

Diabetes mellitus (DM) is a significant public health issue worldwide. The failure of glucose homeostasis, which is characterized by impaired carbohydrate, fat, and protein metabolism, is the result of defects in insulin secretion and/or insulin action.^[20,21] This disease is a metabolic disorder. Current modern drugs for DM frequently suffer from limitations such as high cost, inadequate efficacy, and a variety of side effects.^[22] Medicinal plants with antidiabetic activity, particularly in developing countries, offer a viable alternative for

managing DM due to their cost-effectiveness, accessibility, widespread cultural acceptance, and reduced side effects.^[23] Giving *P. pinnata* extract to mice by mouth in doses of 50, 100, and 200 mg/kg lowered the blood sugar levels that were caused by alloxan.^[24]

Analgesic

Pain is an unpleasant sensation that is the result of intricate neurochemical processes in the central and peripheral nervous systems. Opioids and non-steroidal anti-inflammatory drugs (NSAIDs) are employed to alleviate mild, moderate, and severe pain. The severe adverse effects of these medications restrict their use. NSAIDs can cause gastrointestinal irritation and kidney disorders, while opioids can cause respiratory depression, euphoria, tolerance, and dependence. Consequently, it is imperative to identify and cultivate drugs that are both effective and low-toxicity, one of which is derived from medicinal plants.^[25] It was reported that giving mice 200, 400, or 800 mg/kg of *P. pinnata* extract by mouth decreased the number of mice that writhed when acetic acid was present. The central and peripheral nervous systems showed analgesic activity in response to this effect.^[26]

Hepatoprotective

The liver is a critical organ that plays a significant role in the metabolism, detoxification, and elimination of toxic substances. Despite this, liver disease remains a significant health concern.^[27] Free radicals primarily cause liver disease.^[28] Synthetic drugs employed to treat liver disease are inadequate and occasionally induce severe adverse effects.^[29] As a result, alternative treatments, such as hepatoprotectors, are required, and medicinal plants are one such option. Researchers reported that oral administration of *P. pinnata* extract at doses of 200, 300, and 500 mg/kg protects the liver in paracetamol-treated mice by reducing levels of AST, ALT, ALP, and total protein.^[30]

CONCLUSION

The use of herbal medicines is currently expanding, encompassing pharmacological practices that can aid in disease prevention and treatment. The investigation of plant biopharmaceuticals and nutraceuticals has introduced herbal medicines to the global market. It is evident that the *P. pinnata* plant is versatile due to its numerous pharmacological activities. The current information regarding the *P. pinnata* plant can serve as a foundation for further research, which will entail the identification of the active compounds and the development of newer and more comprehensive pharmacological activities.

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