



Psidium Guineense: A Review On Nutritional Benefit

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Abstract: *Psidium guineense* is the most common shrub known world widely for its fruits and nutritional values present in it. It is distributed most commonly in South America and Brazil. Numerous chemical constituent can be isolated from this plant like steroid sitosterol, triterpene ursolic acid, 17³-etoxiphaephorbide, 2-(4-hydroxyphenyl)ethyl hexanoate, kaempferol, rutin and quercetin which itself is been proven for its pharmacological activity. Based on the different studies carried out on mice and other animals; different extracts of this shrub is been proven for different pharmacological activity like antibacterial, anti-inflammatory, anti-fungal, antimicrobial and antioxidant effect. Using this effect we can find a curative solution for different type of disease like preventing cancer, regulating blood pressure, treating diarrhoea and much.

Index Terms - *Psidium guineense*, Brazilian Guava, Antimicrobial, Anti-Inflammatory, Antioxidant, Myrtaceae

I. INTRODUCTION

A global biodiversity conservation hotspot; Brazilian Savanna which estimated consist of 837 species of birds, 161 species of mammals, 150 species of amphibians and 120 species of reptiles and with numerous endemic plants surrounding them.¹ Among such a great diversity collection of nature one of endemic fruit is *Psidium guineense*.² It is commonly known as “araca”, Brazilian guava or guava which is a native shrub of the Brazilian savanna from Myrtaceae family.³ Its shrub is been identified with its twisted stem, smooth bark with leathery leaves.³ This evergreen shrub has well adapted its climate and soil of northeastern Brazil, where it grows spontaneously all over.^{1,4} They have been noted for its berry type fruits with whitish pulp which is emerged with numerous seeds and covered with different type of colored peels like yellow, red or purple.⁵ Other than *Psidium guineense*, the central west region of brazil has observed to consist of other different type of species too.⁶ There in this review we had mainly focused on both pharmacological properties and chemical composition of *P. guineense*. Also we had included taxonomical classification, shrub description and nutritional values for the same. Its aim is to provide an overview of the chemical and pharmacological potential of the plant for its optimal valuation.

Common names⁶: Brazilian Guava, Sour Guava, Guinea Guava

1.1 Taxonomical Classifications⁷

The taxonomical classification shows that the kingdom is Plantae as shown in table 1.

Table 1: Scientific classification of *Psidium guineense*

Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Myrtales
Family	Myrtaceae
Genus	<i>Psidium</i>
Species	<i>Psidium guineense</i>

1.2 Plant (Shrub) Description

P. guineense is a slow growing shrub of average height 1-3 m and sometimes it's can be max to 7 m. Identification of this shrub can be done by its grayish bark, young shoots and cylindrical or slightly flattened branch-lets.⁸ Morphologically leaves present itself 3.5 – 14 cm long and 2.5 -8 cm wide, they are grayish in color with oblong, elliptic, ovate shape. The upper part of leaf has scantily hairy or sometimes finely toothed hairs on it whereas beneath is covered with pale or rusty hairs and distinctly dotted with glands on it.⁹

The axils of the leaf experience growing of its flowers, it may be single or clustered of three. They are white in appearance with 150 to 200 prominent stamens.⁹ From the flower the developed 1 – 2.5 cm wide fruit appears as round or pear-shaped. The skin is generally yellow in color, thickened, pale – yellowish flesh surrounding the white central pulp. They are acidic, resinous, and has slightly strawberry – like flavour. After getting fully ripen it contains numerous small, hard seeds.¹⁰

Figure 1: Representing different parts of *P. guineense* (Source: Sheldon Navie Photographs)



1.3 Various Species¹²

Table 2: Various species of *Psidium guineense*

Psidium amplexicaule	Psidium incanescens
Psidium araoRaddi	Psidium montanum
Psidium aracaRaddi	Psidium pedicellatum
Psidium ustraleCambess	Psidium robustum
Psidium friedrichsthalium	Psidium cinereum
Psidium galapageium	Psidium harrisianum
Psidium guajava	Psidium sartorianum
Psidium firmum	Psidium sintenisii

II. Bioactives:

Seven phytochemical constituents can be isolated from different parts of the shrub by using specified solvents which has recorded pharmacological action. The first compound was isolated in the form of colorless crystals and was identified by NMR as steroid sitosterol.¹³ This phytosteroids is well known for its anti-inflammatory action in the body and also as a precursor for vitamin D.¹³ Secondly, a white powdered form chemical constituent was isolated which was identified as the triterpene ursolic acid using 1 D and 2 D NMR. This compound are most common to be recorded from Myrtaceae family and shows various pharmacological properties like anti-inflammatory, cytotoxic, anti- HIV & antiplatelet effect.¹⁴ The third compound was demonstrated as antioxidant and cytotoxic activity pursuing agent.¹⁵ It was gained in the form of green solid and later on was identified as 17³- etoxiphaephorbide, a derivative of chlorophyll.¹⁶ The fourth compound was isolated in the form of yellow solid using ethyl acetate and was confirmed to be tyrosol ester derivative, 2-(4-hydroxyphenyl)ethyl hexanoate (Aracain) by 1 H NMR spectrum. The pharmacological action of it is been observed in finding yet.¹⁷ Nextly compound fifth, sixth and seventh was isolated in the form of yellow solid using methanol as a solvent and was identified as Flavanoids i.e. kaempferol, rutin and quercetin respectively. They are well known for its multi-targeting action as an antioxidant, anti-inflammatory and antiviral activities.¹⁸ The rich literature work shows different biological and pharmacological potentials of secondary metabolites as antioxidant, anti-inflammatory and antimicrobial activities with high nutritional value as shown in Table 3. Hence, give proper justification of traditional use of *P. guineense*.¹⁹

Table 3: Nutritional values of *Psidium guineense*.

Energy (Kcal) KJ	(73) 307
Water (g)	77.3
Protein (g)	1
Fat (g)	0.47
Available carbohydrates (g)	12.05
Dietary Fiber (g)	8.4
Ash (g)	0.73
Ca (mg)	40
Fe (mg)	1.76
Mg (mg)	15
P (mg)	38
K (mg)	306
Na (mg)	2

Zn (mg)	2.75
Vit A- RAE (mcg)	3
B- carotene (mcg)	28
VitC (mg)	1.53

Dietary Fiber is a common element in plant-based foods, encompassing various materials with different chemical and structural characteristics that are not easily broken down by digestive enzymes.⁴ Including dietary fibers in diet is highly recommended for their ability to boost digestion. The pulp of Araçai, a type of guava native to the Brazilian savanna, has been found to have 4.82 grams of total crude fiber per 100 grams, indicating that it is a valuable provider of dietary fibre.⁵ *Psidium guineense* are a rich source of minerals such as potassium, magnesium, iron and phosphorous. Minerals are inorganic compounds that exist naturally and are required for the regular growth and functioning of the human body. Consumption of food rich in minerals has been demonstrated to enhance the physiological and metabolic functions of the human body.

In addition several volatile oils were also isolated from the leave part of the shrub using hydro-distillation process and were identified with the help of GC and GC-MS.²⁰ The isolated oils were α -pinene, myrcene, limonene, β -caryophyllene, caryophyllene oxide, α -copaene, ar-curcumene, β -bisabolene, muurola-4,10(14)-dien-1- β -ol, epi- β -bisabolol and β -bisabolol.²⁰

Referring different papers concluded the anti-inflammatory activities of limonene, α -pinene and β -caryophyllene.²¹ Limonene was reported for its anti-inflammatroy effects on by in vivo and in vitro studies and hence, suggested as a diet supplement in reducing inflammation.²¹ The infiltration of peritoneal was decreased exudates leukocytes and the number of polymorphonuclear leukocytes were also reduced, in the induced peritonitis.²² The anti-inflammatory effect of α -Pinene was noted in human chondrocytes, exhibiting potential anti-osteoarthritic activity.²³ The β -caryophyllene was also evaluated for its anti-inflammatory effect.²⁴

III. Pharmacological effect:

Antioxidant Activity:

P. guineense was found to produce antioxidant activity on serum antioxidant capacity test performed on wistar rats.²⁵ The highest antioxidant effect was been recorded for antioxidant activity by DPPH, ABTS and MDA methods in the combination with spathulenol.²⁶

Antimicrobial Activity:

The minimal inhibitory concentration of *P. guineense* in the combination with other drugs was found to be give synergistic effect in the experiment held to determine antimicrobial concentration of the same.²⁷ The test for inhibition of microbial growth was carried out with *S. aureus* and *P. aeruginosa* which ended with the conclusion of antimicrobial activity against them of *P. guineense*.²⁸

Anti-inflammatory Activity:

Anti-inflammatory activity was recorded of *P. guineense* in the combination of spathulenol using two models, including pleurisy and oedema, in mice.²⁶ 70 Brazilian medicinal plants was been collected and tested for its anti-inflammatory activity, in which *P. guineense* was one of it.²⁸

IV. Discussion:

This shrub can be categorized as one of the most important plant worldwide for its medicinal values. Commonly called as guava or Brazilian guava is a plant which has been used traditionally for its curative nature in respect to different type of disease. The aim of this review is to present phytochemical constituents and pharmacological effect of our given shrub. As given a good quantity of lycopene i.e. carotenoid phyto-nutrient is present in guava, which is considered for its anti- tumor and prostate cancer protective nature.²⁹ The fruit is rich in high dietary fibers which can reduce the sugar levels, so can conclude with its beneficial properties in diabetes also.³⁰ Anti-inflammatory activity derive from this fruit can be used against chronic pain in patient.³¹ The fertility in human can be enhanced with the help of mineral known as folate present in it.³² The antimicrobial and antibacterial properties present into it can flush out all the toxins and bacteria present in the GIT.³² The presence of magnesium turn out to give relaxant effect to our smooth muscles. The pinker the pulp of it represents higher the concentration of lycopene in it.³³

V. Conclusion:

We can conclude with the results which show that *Psidium guineense* was examined for its anti-oxidant, anti-microbial, anti-inflammatory properties and the nutritional values. The upcoming researchers can go for its anti-diarrhoeal, anti-hypertensive, Analgesic, anticancer, anti-hypertensive, antifungal, anti-pyretic properties examination in it. The whole fruit obtain from this plant is edible and can be eaten as raw or even after cooking it also. Pulp of it can be used for preparation of different type beverages also. Leaves are also edible for its medicinal properties. This super food is mainly used for its nutritional values present into it. So we should cultivate it in larger amount so that more nutritional benefits of it can be used by many individual at cheaper cost.

VI. Reference:

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