



***Pleiocarpa Pycnantha* (Apocynaceae): A Review on Phytochemistry and Chemotherapeutic Potential**

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ABSTRACT

Pleiocarpa pycnantha belong to the family Apocynaceae which is widely distributed throughout tropical Africa. It has an impressive range of medicinal uses. Different parts of this plant contain families of compounds such as alkaloids, Terpenoids, Saponins. The *P. pycnantha* plant provides active compounds like ursolic acid, 27-p-E-coumaroyloxyursolic acid, 27-p-Z-coumaroyloxyursolic acid, pycanocarpine, 2-carboxy-3-hydroxy derivative of pycanocarpine. *P. pycnantha* is very important for its medicinal value. Various parts of this plant such as the leaves, roots, seed, bark, fruit, flowers and immature pods act as laxative, anthelmintic, possess antitumor, diuretic, anti-inflammatory, antibacterial and antifungal activities, and are being employed for the treatment of jaundice, diarrhea. *P. pycnantha* is then administered to gain and retain good memory. This review focuses on the detailed phytochemical composition, medicinal uses, along with pharmacological properties of different parts of this tree.

Keywords: *Pleiocarpa pycnantha*; Phytomedicine; Traditional uses; Pharmacological properties; natural products, Literature sources.

INTRODUCTION

The term, herbal medicines, has been defined as medicinal products whose active ingredients are derived from aerial or underground parts of plants or other plant material or the combination of them, whether in the crude state or as a plant preparation [1,2,3].

Nowadays, a renewed interest in traditional medicine is observed and there has been an increasing demand for more drugs from plant sources. This revival of interest in plant derived drugs is mainly due to the current widespread belief that “green medicine” is safe and more dependable than costly synthetic drugs many of which have adverse side effects. The need of the hour is to screen a number of medicinal plants for promising biological activity [4]. The World Health Organization estimated that about 80% of Africa population (80 to 85% in Benin) use traditional medicine for their primary health care [5]. This population has a very rich medicinal flora, it has species of plants which are often quoted in various areas of the continent for their biological activities. In this review, we interested ourselves to *Pleiocarpa pycnantha*, which have several biological activities in human medicine like animal medicine. The aim of this study is to present the various uses of the plant, its chemical composition, its pharmacological activities starting from the studies beforehand carried out on it. This work will contribute to ethnopharmacognosy knowledge safeguarding for future generation.

METHOD

In the present review, information regarding medicinal properties and biochemical properties of *Pleiocarpa pycnantha* was gathered via searching books and scientific databases including PubMed, Elsevier, google scholar, Springer, etc...

RESULTS AND DISCUSSION

Distribution

P. pycnantha belong to the family Apocynaceae which is widespread from Senegal east to Kenya and South to Angola and Mozambique [6]. It's called in fongbe (tongue of Benin) vonma, [7]. It occurs in the under storey of rain forests as well as in gallery and montane forests up to 2300 m altitude. It can also be found in disturbed forests. It is widely distributed throughout tropical Africa [8,9].



Figure 1: Geographical distribution of *P. pycnantha* [9]

It is An evergreen shrub or tree 1-5–30 m. tall; bark grey, smooth or slightly scaly; slash whitish, cream or pale brown with darker yellow striations, brownish yellow beneath, yielding milky latex and the branches are subsarmentose. Young twigs are glabrous, angled and sometimes may have a verticillate branching-pattern. The leaves thinly coriaceous, opposite or in whorls of 3-5, completely glabrous; petiole 3-20 mm. long, angled, often narrowly winged almost to the base by a continuation of the lamina; lamina (4) 6-13.5 x (1.3) 2.2–5.5 cm, elliptic to obovate or narrowly obovate, the apex cuspidate with short rounded acumen or acute with rounded tip, the base attenuate; upper surface glossy, with all nerves raised (midrib both prominent and channeled); lower surface paler and mat, all nerves raised; lateral nerves \pm parallel, 2-4 mm apart, joining near the margin in a neatly looped vein; edge of leaf forming little pleats when pressed flat. The flowers are white, fragrant, in dense axillary fascicles on new and old wood; pedicels up to 1 mm long, glabrous. Calyx 15 – 2 mm long; sepals ovate, free, glabrous, corolla tube 5 – 8 mm long, narrowed in the middle, glabrous externally, pubescent internally in upper half, hairs longest just below the anthers; corolla lobes 2 – 4 x 15 – 25 mm, elliptic, glabrous, not strongly overlapping. Their stamens are inserted at about 4-6 mm above the base of the corolla tube, the filaments are minute and the anthers is usually about 0.5–1 mm long. Gynoecium 4–6.5 mm long; ovary c. 1 mm long, cylindrical, glabrous, of 2 free carpels each containing 1–4 ovules; style slender, flattened; clavuncle 2-lobed; stigma reduced to a flat region at apex of clavuncle. *Pleiocarpa* fruit comprising 2 clavatemericarps 7–20 x 4.5–18 mm, pale green to orange when ripe, each containing 1 or 2 salmon-pink seeds [8, 9]. It has about five species and it is related to *Hunteria* and *Picralima*. *P. pycnantha* flowers and fruits throughout the year [6]

It is generally not threatened by erosion because it is found in various forest types and it is widely distributed. It has like synonym *Pleiocarpa flavescens* Stapf (1902) and *Pleiocarpa micrantha* Stapf (1902).



Figure 2: Photo (a) branch, (b) shrub, (c) Leaflet of *Pleiocarpa pycnantha*

Uses of plants of *Pleiocarpa pycnantha*

The wood is white, hard and durable, used for building poles tool handles, pestles, pegs, wooden spoons and firewood [11].

The wood is used for local construction [8, 12], plane blocks, comb, and in carving in which case it is used to make pipe stem in Uganda. Pulp of this plant at low tree step are consumed by bonobo (*Pan paniscus*), of Wamba Forest, Central Zaire [13].

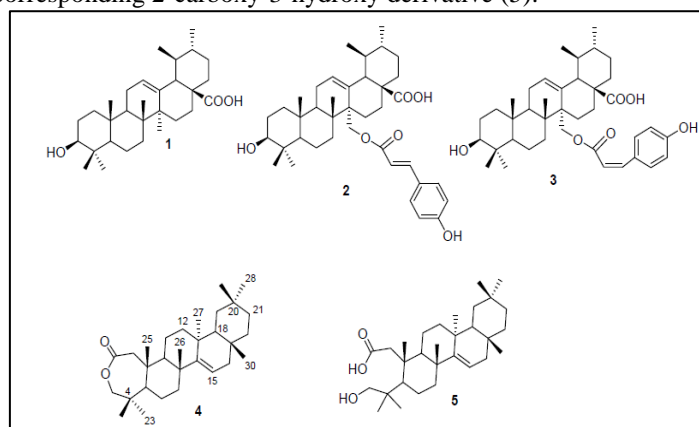
Traditional uses of plants of *Pleiocarpa pycnantha*

Its Ground roots mixed with seeds of *Aframomum melegueta* K. Schum and palm wine is taken as a laxative. In Benin, leaf maceration with lemon juice is given to patients suffering from jaundice, oedema, reduced urine excretion and infection by roundworms. *P. pycnantha* is used as anthelmintic and to treat stomach problems [9]. Indeed, in Benin decoction of the leaves of this plant is used against the diarrhoea and helminthiasis for animals [14, 15] and for human [7]. The Yoruba speaking part of West Africa combine a blend of leaves of *P. pycnantha* (Apocynaceae), leaves of *Spondias mombin* (Anacardiaceae) and a fruit of *Aframomum melegueta* (Zingiberaceae) which is then administered to gain and retain good memory [16]. The Ekiti people of Nigeria administer the leaf decoction with lime juice for people suffering from roundworm [6]. The WaShambaa chew the roots to stimulate sex In Tanzania [11].

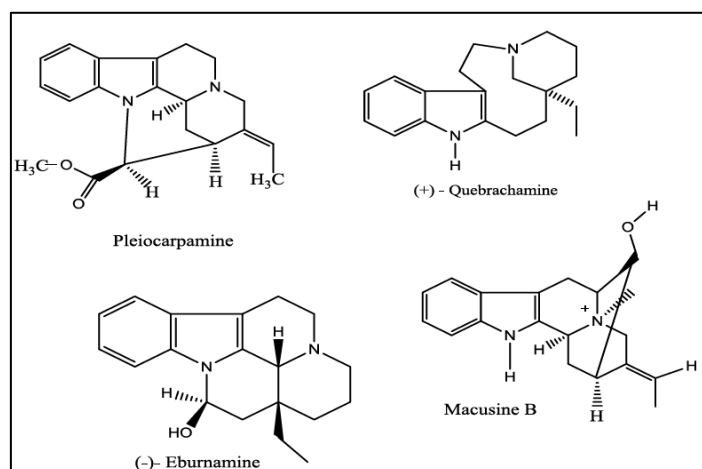
Phytochemistry

The phytochemical screening of *P. pycnantha* revealed the presence of families of compounds such as alkaloid [17,18], terpenoids, Saponins [6].

Omoyeni *et al.*, 2014, in her works, found ursolic acid (1), 27-*p-E*-coumaroxyursolic acid (2), 27-*p-Z*-coumaroxyursolic acid (3), and a new triterpene, which he have named pycnanocarpine (4), which was further hydrolyzed to give the corresponding 2-carboxy-3-hydroxy derivative (5).



Some indole alkaloids: pycnanthine, pleiocarpamine, quebrachamine, macusine and (-) eburnamine have been isolated from *P. pycnantha* roots and bark since 1969 [17] (Gorman and Schmid, 1967; [18] Gorman *et al.*, 1969).



Antitumor and anticancer activities

Many authors worked on the anti-cancer activity of *P. pycnantha*. And they found that this plant have anti-cancer activity. For Keawpradub *et al.* [19], Pleiocarpamine has demonstrated anticancer potential. And Omoyeni suggested that pure compounds isolated from *P. pycnantha* (ursolic acid, 27-*p-E*-coumaroxyursolic acid, 27-*p-Z*-coumaroxyloxyursolic acid, and apycanocarpine and, 2-carboxy-3-hydroxy derivative) have demonstrate cytotoxic activity against cervical, breast and colon cancer [20].

CONCLUSION

So far numerous studies have been conducted on different parts of *P. pycnantha* but there is a dire need to isolate and identify new compounds from different parts of the tree, which have possible antitumor promoters as well as inhibitory properties. Although preliminary studies are under way in different laboratories to use the various activities, these studies must also be to lead in direction of the improvement of animal health, especially the livestock. Anthelmintic activities of these plants could constitute an approach interesting for the improvement of animal health. In view of its multiple uses, the *P. pycnantha* plant needs to be widely cultivated in most of the areas where climatic conditions favor its optimum growth. In this way, a maximum yield of its different useable parts could be achieved to derive the maximal amount of commodities of a multifarious nature for the welfare of mankind.

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