

Review Article

A REVIEW ON BAUHINIA PURPUREA L.: TRADITIONAL USES, PHARMACOLOGICAL PROPERTIES AND CHEMISTRY

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ABSTRACT

*Bauhinia purpurea* L. can be considered as one of the popular medicinal plant in Southern Asia and is widely distributed in Asia's region. Extensive research and studies have been carried out to prove the pharmacological properties of various part of this plant as claimed by the traditional medicinal practice. Furthermore, the isolation of the responsible bioactive compounds from the plant has become the major interest in providing the information of its chemical constituents that correlates with the pharmacological properties. *B. purpurea* has a value in biological activities such as antinociceptive, antifungal, wound healing, antidiabetic, antiulcer, antioxidant, hepatoprotective, nephroprotective, antidiarrhoeal, anti-inflammatory, antipyretic, analgesic, antimalarial, gastro protective and cytoprotective activity. This review presents a detailed survey of literature on phytochemistry, traditional and biological evaluated medicinal uses of *B. purpurea*.

INTRODUCTION

*Bauhinia purpurea* L. belongs to the family fabaceae and commonly known as butterfly tree [1]. In Malaysia, the tree is known as 'tapak kerbau' or 'tapak kuda' while in India, which the plant is widely used by the people, this plant is known as 'kachnar' or 'khairwal'. *Bauhinia purpurea* is a small to medium-sized deciduous fast-growing tree. Its bark is pale grey brown and the twigs are slender, light green and slightly hairy. The heartwood of *B. purpurea* is brown, hard and durable. The leaf of *B. purpurea* is unique because of its two-lobed and equally wide and also the flowers usually appear on the trees from September to November with purple colour. The flowers have brown, flat seed pods.

300 species of the genus *Bauhinia* are found in tropical regions. The genus includes trees, vines and shrubs that are frequently planted as ornamental. The generic name commemorates Jean and Gaspard Bauhin. The two lobes of the leaf exemplify both Swiss botanists and the specific name refers to the purple colour of the flowers. *B. purpurea* is native in Southern Asia, South East Asia, Taiwan and Province of China. This plant also can be found in Australia, United States of America and Puerto Rico.

TRADITIONAL USES

*Bauhinia purpurea* L. can be found throughout peninsular India. It has been reported that the root, stem, bark and leaves are being used against

diseases such as jaundice, leprosy, cough and also in several Ayurvedic medicine formulation [20]. The people of Kathkors and Gondas of India cooked and eat the young pods and mature seeds of *B. purpurea* [23]. Chopra et al. also reported that the bark of this plant is used traditionally as an astringent in diarrhoea. Some also reports that the plant is used in the treatment of dropsy, pain, rheumatism, convulsions, delirium, and septicaemia [2]. The decoctions are also recommended for ulcers as a useful wash [10]. Another report stated that the plant parts are used in indigenous medicine for curing body pain, fever, cancerous growth in the stomach and indigestion [9].

The Paliyar tribals in Theni district of Tamil Nadu used the decoction of stem bark of *B. purpurea* to treat dysentery [7]. The bark extract of this plant is also extensively used in glandular disease and as an antidote to poison [28]. The bark paste is also used by the Taungya community of eastern Uttar Pradesh to treat scorpion bites and rheumatism and the flowers paste is used to treat constipation [22]. The root of *B. purpurea* is also used for treatment in carminative, diarrhoea, ulcer, boils and abscesses based on the study of the medicinal plants in the Sitamata Wild life sanctuary in Chittorgarh district of Rajasthan [10]. Decoction of the bark is used externally as astringent and internally for diarrhoea by the people in Mizoram [27]. In Pakistan, the fresh and dried flower buds of *B. purpurea* are used as a food material. The leaves, stems and roots are also widely used in Pakistan to treat infections, pain, diabetes, jaundice, leprosy and cough and also in

several medicinal formulations [15]. Although this plant is used in Southern Asia, there is no documentation found for its uses as medicine in other continents.

### PHARMACOLOGICAL PROPERTIES

The pharmacological properties of *B. purpurea* has been recently studied among researchers in order to evaluate and proved the claim of traditional medicine on the ability of various part of the plant that are used to treat diseases.

#### Root

The root of *B. purpurea* has been studied for several pharmacological properties and it has been proved to have antimalarial, antimycobacterial, anti-fungal, anti-inflammatory and cytotoxic activities [4]. It also proven as anti-cancer [14].

#### Leaves

The aqueous extract of the leaves of *B. purpurea* has been proved to possess antinociceptive, anti-inflammatory and antipyretic properties by Zakaria et al [35]. The leaves were also tested for its antioxidant activity using DPPH radical scavenging assay and also superoxide scavenging assay and showed high activity [34]. Ethanol extract of the leaves are used for analgesic, antipyretic, anti-inflammatory, antispasmodic and antimicrobial activity [29]. The leaf extract of *B. purpurea* was also reported to have significant antidiarrheal activity in vivo [16].

#### Stem

The stem of *B. purpurea* was studied and proved that its ethanolic extract and fraction exhibited anti-diabetic property in alloxan-induced diabetic rats. The extract and fraction also possess adrenergic activity [17].

#### Bark

The bark extract of *B. purpurea* was studied and has been proved for its regulation of circulating thyroid hormone concentrations in female mice without causing hepatotoxic effects [18].

### BIOACTIVE COMPOUNDS AND CHEMISTRY

#### Root

Studies also have been done in isolation of the bioactive compounds from the root of *B. purpurea*. A crude CH<sub>2</sub>Cl<sub>2</sub> extract of *B. purpurea* root was purified and 11 new secondary metabolites have been discovered by Boonphong et al. [4]. These includes two flavanones, five known bibenzyls, eight dihydrodibenzoxepins, a dihydrobenzofuran, a novel spirochromane-2,1'-hexenedione and a new bibenzyl.

#### Leaves

A phytochemical screening of *B. purpurea* leaves aqueous extract has revealed the presence of several compounds such as flavonoids, saponins, triterpenes and steroids [34].

#### Stem

From the stem of *B. purpurea*, a novel flavone glycoside, 5,6-dihydroxy-7-methoxyflavone 6-O-β-D

-xylopyranoside was isolated from the chloroform-soluble fraction of the ethanolic extract [32]. Chalcone glycosides [3] and amino acids [6] also have been obtained, previously.

#### Heartwood

A study done by Kuo et al. [12,13] reveals a novel 6-butyl-3-hydroxyflavone, 6-(3"-oxobutyl)-taxifolin from the heartwood of *B. purpurea* derived from the methanol extract. Previously, 22 compounds including flavonoids, phenols, chromones and sugars have been isolated [12].

#### Seed

The seed of *B. purpurea* are rich in crude proteins (25.6-27.2%), crude lipid (12.3-14.3%), fibre (4.6-5.8%), carbohydrates (51%), minerals and amino acids, as reported by Rajaram & Janardhanan (1991) and Vijayakumari et al. [30]. Unsaturated fatty acids comprise 66% of the total fatty acid content. Other compounds such as free phenolics, tannins, phytic acid, L-dopa, protease inhibitors, lectins, hydrogen cyanide, saponins and oligosaccharides also have been discovered from *B. purpurea* seed [23,30,33]. Another chemical study done by Bhartiya & Gupta [3] and Wahab et al. [31] on the methanolic extract from seeds of this plant identified flavonoids and their glycosides. A recent study by Ramadan et al.[25] has characterized neutral lipids in the crude seed oil and also glycolipids and phospholipids. Linoleic, palmitic, oleic and stearic were the major fatty acids in the crude seed oil and its lipid classes. The oil was also characterized by a relatively high amount of phytosterols as the sterol markers were β-sitosterol and stigmasterol. β-Tocopherol has been isolated as the major tocopherol isomer with the rest being δ-tocopherol.

### CONCLUSION

Globally is now changing towards the application of plant products for traditional medicine. Various part of plant is used to treat various ailments and *B. purpurea* possesses huge pharmacological ability capable to treat wide range of disease. Various scientific researches proved the phyto-pharmacological properties and this review provides the information about the pharmacological potential of *B. purpurea*.

### CONFLICTS OF INTEREST

None to declare

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