

Phytochemical and antioxidant assessments of three fractions from methanol extract of *Spathodea campanulata* Beauv. Leaves

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Spathodea campanulata species is not yet widely naturalised, but it is cultivated throughout large parts of the country as a garden plant and street tree. It has a scattered distribution in the coastal areas of central and northern Queensland and is present in the northern parts of the Northern Territory. It is also becoming naturalised on Christmas Island and in south-eastern Queensland. A tree that invades abandoned agricultural land, roadsides, waterways, disturbed sites, waste areas, forest margins and disturbed rainforests in tropical and sub-tropical regions. It favours wetter habitats, and is especially common along creeks and gullies. The large and very showy flowers are arranged in dense clusters (8-10 cm long) at the tips of the branches (i.e. in terminal racemes) on stalks (i.e. peduncles) up to 10 cm long. Individual flowers are borne on short stalks (i.e. pedicels) that are covered in brownish-coloured hairs. These flowers have sepals that are fused into a horn-shaped structure (i.e. calyx tube) that splits along one side as the flowers open. This distinctive horn-shaped calyx is curved upward, somewhat ribbed, and brownish in colour (about 5 cm long). The reddish-orange coloured petals (10-12 cm long) are also fused together (i.e. into a corolla tube) and are shaped somewhat like a tulip flower (i.e. they are tubular). The mouth of the flower is about 7 cm across and has several indistinct lobes with crinkled (i.e. crisped) margins that are yellowish in colour. Each flower also has four stamens with large dark brown anthers (about 15 mm long) that are borne on stalks (i.e. filaments) about 5 cm long. They also have a long yellow style (8 cm long) topped with a reddish stigma. Flowering occurs throughout the year, but usually peaks during spring. The large and elongated capsules (17-30 cm long and 3.5-5 cm wide) resemble pods. They are slightly flattened and turn from green to brown in colour as they mature. When mature they split open and release about 500 papery seeds. These seeds are very light and surrounded by a see-through (i.e. translucent) membranous wing. This plant reproduces mostly by seeds, which are light and usually released from a significant height. Larger trees may also spread via root suckers, particularly when they are damaged. Seeds are most commonly wind-dispersed, but they may also be spread by water (if plants are growing along waterways) and in dumped garden waste. This species is declared under legislation in the following states and territories: Queensland: Class 3 - this species is primarily an environmental weed and a pest control notice may be issued for land that is, or is adjacent to, an environmentally significant area (throughout the entire state). It

is also illegal to sell a declared plant or its seed in this state. Western Australia: Unassessed - this species is declared in other states or territories and is prohibited until assessed via a weed risk assessment (throughout the entire state). Methanol extract of *Spathodea campanulata* leaves was obtained by cold extraction, and partitioned into hexane, ethyl acetate and methanol fractions. Phytochemical screenings of the fractions were carried out using standard procedures to identify the class of constituents present in each of them. Ethyl acetate fraction was subjected to column chromatographic separations by gradient elution, and isolates were TMS (Trimethylsilyl) derivatized and characterized by GC-MS (gas chromatography-mass spectrometry). Antioxidant content was also evaluated on the three fractions using 2, 2-diphenyl-picrylhydrazyl (DPPH) free radical scavenging method. An antioxidant can be broadly defined as any substance that delays or inhibits oxidative damage to a target molecule [3]. The main characteristic of an antioxidant is its ability to trap free radicals. Antioxidant compounds like phenolic acids, polyphenols and flavonoids scavenge free radicals such as peroxide, hydroperoxide or lipid peroxy and thus inhibit the oxidative mechanisms that lead to degenerative diseases. Herbal plants considered as good antioxidant since ancient times. Percentage of inhibition and IC50 values were obtained for each fraction. Phytochemical screenings revealed presence of alkaloids, tannins, saponin, resins, phenol, cardiac glycosides, steroids, flavonoids, anthraquinones and terpenoids in the three fractions in varying concentrations. Alkaloids, resins, phenol and cardiac glycosides were found to be intense in the three fractions, while phlobatannin was found to be absent in all the three fractions. Three compounds isolated from the ethyl acetate fraction were characterized based on MS and IR spectral interpretations as palmitic acid, ethylamine and caffeic acid. Percentage of inhibition of the three fractions indicates that they have substantial antioxidant activity with the standards at high concentration of 250-1000 µg/mL. The hexane fraction has the highest antioxidant activity with an IC50 of 178.46 µg/mL when compared to other fractions; this paper reports phytochemical constituents and high antioxidant activity (at concentrations of 250 µg/mL and above) of the African tulip tree (*Spathodea campanulata*) when compared to the standards. This has not been earlier reported in literature, our result supports its wide ethno-medicinal applications.