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Commonly Called Babools : Plants of Multipurpose Medicinal Uses

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ABSTRACT

Babool (Acacia Nilotica) a very common name, is used in Indian system of medicine for the prevention and treatment of various health ailments, has been in practice for hundreds of years. The some other species of Babool known as Vilayti Babool (Prosopis Juliflora) and Subabool (Lucena Lucocephala) are also having so many ethnobotanical and medicinal uses like Babool. This article briefly reviews the ethnobotanical as well as medicinal uses of Babool and its other species with plant description. This is an attempt to compile and document information on different aspect of Babool and its other species and its potential uses. More studies are needed before the pharmacological properties of Babool and its other species can be utilized in therapy.

Keywords: - Acacia, medicine, Prosopis, Baool, ethno-botanical

INTRODUCTION

1. Babool *(Acacia Nilotica):* *Acacia* is the most significant genus of family: Leguminosae, first of all described by Linnaeus in 1773. It is estimated that there are roughly 1380 species of *Acacia* worldwide, about two-third of them native to Australia and rest of spread around tropical and subtropical regions of the world [1].The Babul tree is a strong light demander but is susceptible to frost. The greatest plus point is that it tolerate seven insensitive droughts. It is a tree of miraculous adaptations. As its adaptation is very wide, this tree is distributed widely in India under different climatic conditions. It seldom extends above 500 m in altitude. It grows well in dry, hot arid climates with high mean maximum temperature regime (upto 500^0C) and very low minimum temperature (even below 0^0 C) that is, even in deserts. The rainfall requirement ranges from 100 mm to 1000 mm. Babul is known for its

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endurance to very long hard summer seasons and in water logged areas. It can come up in saline or brackish water too. The long taproot is an adaptation to absorb water from depths and Kankrilli layers. It is called as a "Phreatophyte" meaning a plant, which is able to scavenge water from deeper soil layers. Ittolerates salinity; pH is of range from 7.5 to 8.5. It can also come up in shallow soils and rocky areas. It is not a good coppice and root suckers are absent in the species [2].

Pharmacological and Biological Studies

Antidiabetic: Wadood *et al*., demonstrated that *Acacia arabica seeds* contained a substance(s) which depressed the blood glucose level in normoglycemic but not in alloxan-diabetic rabbits, suggesting that the mechanism of action involved release of insulin from pancreatic beta-cells. The bark in the form of decoction (20 mg/kg) as well as the standard drug talbutamide produced a significant reduction in blood glucose levels in mild alloxonised diabetic rabbits fasted for 18 hr [3].

Antimutagenic: The methanolic extract of the bark decreased the UV- induced mutagenicity using the Escherichia coli WP-2 in a dose of 5 mg/plate. This decrease might be due to some enzymatic action which reverted the formation of pyrimidine dimmers [4].

Antiproteolytic: Inhibition of total proteolytic (caseinolytic), tryptic (by hydrolysis of benzoyl arginine p-nitroanilide) and chymotryptic (by hydrolysis of acetyl tyrosine ethyl ester) activities by ten species of legume seeds on human and bovine pancreatic proteases were studied. *Acacia* seeds extracts displayed more pronounced action on human trypsin and chymotrypsin, it was more effective in inhibiting the total proteolytic activity of the bovine system [5].

Antibacterial: The antimicrobial activity of the extracts of *Acacia nilotica* was assayed against *Streptococcus viridans*, *Staphylococcus aureus*, *Escherichia coli*, *Bacillus subtilis* and *Shigella sonnei* using the agar diffusion method. The plant extract exhibited antimicrobial activity against all the test microorganisms. *B. subtilis* was the most susceptible to the plant extract while *Candida albicans* was the most resistant. The minimum inhibitory concentration of the stem bark extract of the plant ranged between 35 and 50 mg/ml while the minimum bactericidal concentration ranged between 35 and 60 mg/ml. *A. nilotica* could be a potential source of antimicrobial agents [6]. The antibacterial activity of aqueous extract,

different solvent extracts and isolated constituents of were evaluated by the cup diffusion method against Aqueous, methanol and ethanol extracts of leaves of *Acacia nilotica* (Family: *Fabaceae*) showed significant antibacterial activity against three phytopathogenic *Xanthomonas* pathovars viz., *Xanthomonas axonopodis* pv. *malvacearum*, *X. a*. pv. *phaseoli* and *X. campestris* pv. *vesicatoria* associated with angular leaf spot of cotton, common blight of bean and bacterial spot of tomato respectively and 14 human pathogenic bacteria. This active fraction fractioned from methanol extract recorded highly significant antibacterial activity *in vitro* (MIC 5, 6 and 7 µg/ml for *Xanthomonas* pathovars and 6-12 µg/ml for human pathogenic bacteria) compared with synthetic antibiotics like Bact-805 and K-cycline for phytopathogenic bacteria and Gentamicin and Streptomycin for human pathogenic bacteria [7].

Antifungal: The polyphenolic complex of the bark at the concentration of 50% showed maximum growth inhibition (56%) as compare to controls against *Fusarium oxysporum.* The extract at the 10 and 25% dilution showed 24% and 37% inhibition, respectively *in vitro* studies**.** The extract of the flower revealed 65% inhibition against the conidial germination of *alternaris solani* after 10 hr of treatment 57. The water extract of leaves inhibited the Mycelial growth of the plant pathogenic fungi *Sarocladium oryzae* (37%) and *Fusarium oxisporum* (69%) 58 while the ethanolic extract exhibited 51.13% inhibition of *Rhizoctonia solani* [8].

Antidiarrhoeal: Five medicinal plants [*Acacia nilotica*, *Acanthospermun hispidum*, *Gmelina arborea*, *Parkia biglobosa* and *Vitex doniana*] used in diarrhoeal treatment in Kaduna State, Nigeria, were investigated. This study was carried out on perfused isolated rabbit jejunum and castor oil-induced diarrhoea in mice. The aqueous methanol extracts (0.5, 1.0, 2.0 and 3.0 mg/ml) were generally found to cause a dose-dependent response in the isolated rabbit jejunum, though this was not uniform in all the plants [9]. *Gmelina arborea* and *Vitex doniana* showed concentration dependent relaxation at low doses (0.5, 1.0 mg/ml), but showed no significant relaxation at higher doses (2.0, 3.0 mg/ml). Other extracts showed biphasic effects. For example, *Acacia nilotica* at 3.0 mg/ml caused initial relaxation quickly followed by contraction. In the castor oil-induced diarrhoeal, 100% protections were shown by extracts of *Acacia nilotica* and *Parkia biglobosa* (100, 200 mg/kg) while *Vitex doniana* showed a dose-dependent effect [10].

Antiviral: The crude extract of the leaves of the plant showed *in vitro* antiviral activity against the *Turnip mosaic* virus. There was a decrease in lesions numbers on the hosts *Chenopodium amaranticolor* (93.77 %) and *C. album* (80.2 %). There was also decrease in lesions when the extract was on the host leaves. The bark extract inhibited the potato virus [11, 12].

Antioxidant: It was found that the antioxidative effect of umbelliferone was dose dependent up to 100µg/ml and then levelled off with no further increase in activity. This is the first report of the isolation and antioxidant potential of umbelliferone from *A. Nilotica* [13].

Antifertility: The aqueous extract of the flowers shoed 11.5 % abortifacient activity in rats. It was further screened for teratological abnormalities in failure cases (where pregnancy was not prevented) in pregnant rats. The foetuses showed gross external morphological and skeletal defects [14].

Anti-Hypertensive and Anti-Spasmodic Activities:

Gilani et al reported that on using of methanolic extract of A. nilotica (A.acacia) reduces the arterial blood pressure and provides evidence of antihypertensive activities independent of muscarinic receptor stimulation 24. An aqeous extract of A. nilotica (A.arabica) was also observed that it have sustained dose-related contractile activity on the isolated guinea-pig ileum. Intravenous administration of the extract produced a dose-related significant elevation of blood pressure [15,16].

Acetyl cholinesterase Inhibitory Activities:

A study was carried out by Crowch and Okello that acetylcholine sterase is the treatment of Alzheimer's disease. It was observed that A. nilotica (A.arabica) have to potent Acetyl cholinesterase inhibitory activities due to effect on central nervous system. More investigations are to be needed in the treatment of Alzheimer's [17].

2. Vilayti Babool (*Prosopis juliflora*): *Prosopis juliflora* (Sw.) DC, an evergreen tree is native to South America, Central America and the Caribbean. It is commonly known as Vilayati Babool in India and its first introduction into India has been reported differently by different people. Rawat et al. (1992) reported that *Prosopis juliflora* was first introduced in India during 1875 in Punjab [18] whereas Reddy (1978) stated that the first

introduction of *P. juliflora* into India took place in 1877, with seeds from Jamaica that arrived in the country one year earlier [19]. The seeds were first sown in various arid areas around Kamalapuram, in the Cuddapah District of Andhra Pradesh (old Madras Presidency) and the plant was named as "the exotic lady of South America". Different from both these, Gupta and Blara (1972) reported that *Prosopis juliflora* was introduced in India in 1857 from Mexico [20]. Based on these reports, it can be stated that *Prosopis juliflora* was introduced in India somewhere during 1870s. In the present state of Rajasthan, it was first introduced in Jodhpur in 1913 where the ruler of the then state of Jodhpur named it "Royal Plant" in 1940 because of its excellent growth rate and evergreen nature in all environmental condition (except frost). Large scale aerial seeding of this tree was undertaken to establish sand dunes and sand storms in Rajasthan [21]. Further introductions of this species followed gradually into the states of Haryana, Uttar Pradesh, Madhya Pradesh, Maharashtra and Tamil Nadu [22,23]. Today, owing to its fast growth and drought hardiness with extraordinary ecological amplitude, the species has been spread throughout the length and breadth of the country, from Haryana in north to Tamilnadu in down south, and from Kutch, Gujarat in west to drier parts of Orissa in east [24].

Medicinal value of Prosopis: In India, boiling wood chips, a bark extract is used as an antiseptic on wounds, and gum is used to treat eye infections [25]. Research done at Central Arid Zone Research Institute, Jodhpur resulted in identification of antioxidant compound which is present in concentrated form (6-8%) in the heart wood of *P. juliflora* [26]. In Brazil, *P. Juliflora* flour is used as an aphrodisiac [27], syrup as an expectorant and tea infusion against digestive disturbances and skinlesions[28].

The most important of these bioactive constituents of plants are terpenes, alkaloids, flavonoids and phenolic compounds. Terpenes are used as insecticides and their pharmacological properties include antibacterial, antifungal, antihelmintic, antimalarial and molluscicidal[29], similarly phenolic compounds have a wide range of pharmaceutical activities such as anti-inflammatory, analgesis, antitumour, anti-HIV, anti-infective, vasodilatory, immunostimulant and antiulcerogenic[30,31]. Recently, flavonoids have attracted interest due to the discovery of their pharmacological activities [32,33]. Alkaloids are pharmaceutically significant and are used as analgesic, antimalarial, antiarrythmic, antispasmodic, in the treatment of coughs and pain, in the treatment of gout, and as pupil dilatin [34].

3. Subabool (*Leucaena leucocephala*): *Leucaena leucocephala* is a small, fast-growing mimosoid tree native to southern Mexico and northern Central America (Belize and Guatemala),[34,35] but is now naturalized throughout the tropics. Common names include white leadtree,[36] *jumbay*, and white popinac.[37] The specific name is derived from the Greek words λευκό, meaning "white", and κέφαλος, meaning "head", referring to its flowers.[38] It is known as Subabool in India. *Leucaena leucocephala*, (Ipil Ipil) belongsto leguminacae, is a giant, dense and quick growing tree, it is cultivated in the tropical dry region including Pakistan, used for forage[39,40,41], medicinally it has been studied on tumour cells[42], as anti-fertility agent[43] and it is also used as the treatment of parasitic diseases[44] it has fungicidal properties[45] and normalize the soil acidity[46,47], salinity and soil erosion [48]. Ipil ipil seeds increase the level of provitamin in chicken[49] foliage is good source of dietary nutrients, can serve as an animal feed and poultry diet[50,51] and it is also used as human food[52] Its wood hasmechanical strength comparable to apitong group and used as abundance in Pakistan but has not found any use in chemical and wood industry or as cattle feed in Pakistan. According to Simanjuk et al. (2010), *Leucaenaleucocephala* seeds have capability to reduce the level of blood glucose[53]. A study by Abdalrahim et al. (2012) showed that *P. speciosa* is an edible legume believed to have medicinal property including antidiabetic[54]. Thehypoglycemic properties of plants related to the present of compound such as flavonoid, tannins, glycosides,alkaloids, polysaccarides and terpenoids [55,56,57].The purpose of this study is to investigate the hypoglycemic effect of *Parkia speciosa* (Petai), *Leucaena leucocephala* (Petai belalang) and *Laurus nobilis* (Daun selom) on blood glucose level. These three plants were selected as it is easily found and commonly consume as salad in Malaysia.

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