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A Review on Medicinal Properties of Gmelina Arborea (Gambhari Plant)

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Abstract: ***Ayurveda is a science of life practiced in Indian subcontinent from the ancient time. In global prospective, it is complete and holistic system in which a number of drugs have multiple beneficial actions are shown. So that the massive research is required to proof the beneficial effect of drugs.***
Gmelina arborea, a fast-growing deciduous tree belongs to the family Lamiaceae, and is an important plantation species in many tropical areas around the world. The species is naturally distributed in semi-deciduous forests in India. The tree is also an important medicinal plant in the Indian Systems of Medicine.
Gmelina arborea (gambhari) also a drug already mentioned in Ayurveda used for the various purposes in ayurvedic literature. This plant have so many medicinal properties like digestive, cardio tonic, diuretic, laxative and pulmonary and nervine tonic. It improves digestion, memory, helps overcome giddiness and is useful in burning sensation, fever, thirst, heart diseases, nervous disorders and piles. In this review paper we concluded the Medicinal properties of Gmnelia arborea (gambhari) plant.

I. INTRODUCTION

Gambhari (Gmelina arborea Roxb.) belonging to the family Verbinaceae. it is found throughout greater part of india,speccialy in western ghant and foot of Himalayas, and deccan.it is medium size plant (hight 15-20 m) this plant is planted in gardens as well as an avenue tree. Gmelina arborea is one of the key ingredient of of most famous Dashamoola and and panchmula. different part of the plant has been used like root, fruit, bark ,stems and leaves for the different medicinal properties like cognitive, Antidiuretic, Anti-diarrheal, Anti-pyretic, Analgesic, Anti-oxidant activity, Anti-diabetic, Anti-bacterial, Anti-fungal activity, Anti-ulcer, Gastro protective effect, Anti-hyperlipidaemic effect, Wound healing activity. The present review shows thepharmacological activites of gambhari plant.

II. PLANT PROFILE

A. Gmnelia Arborea

It consist of dried leaves of gmelina arborea. (Family: - Verbenaceae) mostly Found in Kashmir (India).

B. Geographical Source

Gmelina arborea most commonly found in Kashmir (India), Myanmar, Thailand, Cambodia, Vietnam and china.

C. Taxonomical Classification

Kingdom: - Plantae
Division: - mangoliophyta
Class: - mangoliapsida
Order: - lamiales
Family:-Verbenaceae
Genus:-Gmelina
Species:-G.arborea

III. CHEMICAL CONSTITUENTS

A. Root

Gmelofuran-a, furanosesquiterpenoid, sesquiterpene, cerylalcohol, hentriacontanol-1, beta-sitosterol, n-octacosanol, gmelinol, apiosylskimmin-a, apiofuransonyl-(1→6)-beta-D-glucopyranosyl, (1.0.7)-umbelliferone

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B. Leaf

cluytyl ferulate, n-octacosanol, gmelinol, arboreal, 2-0-methyl arboreal, 2-0-ethylarboreal, isoarboreal, gmelanone, beta-sitosterol, paulowin, 6"-bromoisoarboreal, 4-hydroxysesamine. 4,8-dihydroxysesamin, 1,4-dihydroxysesamin (gummadiol), 2- piperonyl-3-(hydroxymethyl)-4 (alpha-hydroxy - 3-4-methylenedioxybenzyl)-4-hydroxy tetrahydrofuran (I), 4-epigummadiol-4-0-glucoside, 1,4-dihydroxy-2,6-dipiperonyl-3,7-dioxabicyclo [3,3,0]-octane, gmelanone, palmitic, oleic and linoleic acids, stigmasterol, stigmastanol, campesterol, alpha-2-sitosterol, butulinol (heartwood), apigenin, quercitin, hentriacontanol, beta-sitosterol, quercetin, hentriacontanol, beta - sitosterol, quercetogenin and other flavons.piperonyl-3-(hydroxymethyl)-4 (alpha-hydroxy - 3-methylenedioxybenzyl)-4-hydroxy tetrahydrofuran (I), 4-epigummadiol-4-0-glucoside, 1,4-dihydroxy-2,6-dipiperonyl-3,7-dioxabicyclo [3,3,0]-octane, gmelanone, palmitic, oleic and linoleic acids, stigmasterol, stigmastanol, campesterol, alpha-2-sitosterol, butulinol (heartwood); luteolin, apigenin, quercitin, hentriacontanol, beta-sitosterol, quercetin, hentriacontanol, beta - sitosterol, quercetogenin and other flavons.

IV. PHARMACOLOGICAL PROPERTIES

1) *Antidiuretic Activity:* The methanolic extract of G. arborea extract its diuretic activity due to synergistic action of the [$HCO3^-$ / Cl^-], [HCO3+/ H+] exchangers and the [N+/H+] antiporter by inhibiting tubular reabsorption and accompanying anions to cause dieresis.
2) *Anti-Diarrheal:* The stem bark methanolic extract of G. arborea is reported to be used for stomach and urinary disorders. It acts as a laxative. Its decoction is used for loosening phlegm, appetite stimulant and in liver disorders.
3) *Anti-pyretic, Analgesic Activity and Toxicity:* The stem bark extracts of G. arborea has been found to reduce hyperthermia and its effect is comparable to that of the standard anti-pyretic drug. The analgesic activity of G. arborea is found to be more significant as it predominantly inhibit the pain mechanism. The alcoholic extract fractionated with different solvents like petroleum ether, chloroform, ethyl acetate, and n-butanol of G. arborea stem bark has been reported to toxicity and analgesic activity (as a dose 2000 mg/kg) in female Swiss albino mice using the OECD guidelines.
4) *Anti-oxidant Activity:* In vitro-studies on bark and fruit extracts have shown anti-oxidant Activities and protected liver slice culture cells by alleviating oxidative stress induce damage to liver cells. Flavonoids extracted from the aerial parts of G. arborea have shown good anti-oxidant property and good stability.
5) *Anti-diabetic Activity:* The ethanoic extract of the plant has been reported to possess Significant anti-diabetic activity; it increases blood GSH level reinforcing the role of GSH as free radical scavenger and in repair of the free radical caused biological damage. Aqueous extracts from the heart wood bark of the plant G. arbore has been reported to exhibit anti-diabetic activity in Streptozotacin (STZ) induced diabetic rats.
6) *Anti-bacterial Activity:* The crude leaf and stem bark extracts contains bioactive compounds such as alkaloids, saponins, carbohydrates, phenolics, anthraquinonoid and tannins. Due to the presence of these bioactive compounds the plant has been reported to possess significant antimicrobial activities against gram positive and gram negative organisms, E. coli, K. pneumonia, P. dysentria, S. typhia and P. mirabilis.
7) *Anti-fungal Activity:* Some constituents like 7′O-ethyl arboreol, paulownin, gmelinol, epieudesmin and β-sitosterol have been reported to exhibit antifungthis review the Gmnelia arboreaal activity against Trametes versicolor and Fomitopsis palustris. The root extract of G. arborea have been reported to inhibit the growth of Aspergillus niger, Penicillium notatum and Candida albicans
8) *Cardio-protective Activity:* The ethanolic extract of G. arborea has shown potential protective effect against doxorubicin induced cardiac toxicity by increasing cardiac maker's activities in plasma. Insecticidal activity the heartwood of G. arborea is a good source of insecticidal compounds. The aqueous extracts of fresh fruits, leaves and bark exhibit insecticidal property against legume pod borer and pod sucking bug.
9) *Anti-ulcer Activity:* The hydro alcoholic extracts of leaf (286mg/kg and 667mg/kg) has been reported to possess activity against gastric ulcers. The extract was evaluated by using models aspirin induced ulcer, pylorus ligation induced ulcers, ethanol induced ulcers and cold restrains stress induced ulcers.
10) *Gastro Protective Effect:* Preclinical studies have been reported that hydro alcoholic extract of G. arborea showed significant gastro protection in rat model. The gastro protective activity of the test substance was evaluated by using ethanol induced gastric lesions model.

11) *Anti-cancer Activity:* The hydroacetonic crude leaf extract contains phenolic constituents like flavonoids (75.50%), hydroxyl cinnamic acid derivatives (24.49%). It has been reported to exhibit anticancer potential against 6 cancerous cell lines. The cytotoxicity indicate that the Hydroacetonic crude extract shows a good anticancer activity against C6 glioma and HL-60 cells.
12) *Anti-hyperlipidaemia Effect:* The ethanolic leaf extract of G. arborea (as a dose of 150 mg/kg of body weight) has been reported to exhibit significant hypoglycemic activity in animal models when compared with a standard antidiabetic drug glibenclamide.
13) *Wound Healing Activity:* G. arborea is a traditional medicine the ethanolic extract of dried powder of leaves at dose level of 200 mg/kg has shown a good wound healing activity.
14) *Treatment of Hypertension:* Lawson et al. have reported aqueous extract (500mg/kg/day) of G. arborea for treatment of hypertension to wistar rats' model. Used for cell regeneration the stem bark extract (1.00g/kg) of plant G. arborea has been used for regeneration of □-cells of the pancreas in diabetic rats and serum lipid parameters are reported to get improved in G. arborea extract treated to diabetic rats.
15) *Environmental Application:* One of the major issue of the concern of whole world today is increasing level of CO2 in the atmosphere of earth and climate change due to origin level of CO2. A study carried by Rasineni et al. (2011) indicates that G. arborea could accumulate significant biomass and escapaccimatory down regulation of photosynthesis due to high source-sink capacity even with and increase of photosynthesis due to high source sink capacity even with and increase of 100 micron mol $^{-1}$ CO_2 hence this plant species can be used to grown to protect environment against increasing concentrate of CO_2 .
16) *Cognitive Properties:* Gmelina arborea leaf extract (Roxb) Extract has Nootropic property. Phytochemical screening revealed that the major constituents of Gmelina arborea leaf (Roxb) ext. are glycosides, tannins, resins, flavonoid, and steroid. gmelianoside is the main active nootropic principal present in the ext. of GA plant. Apart from memory enhancer activity**.**

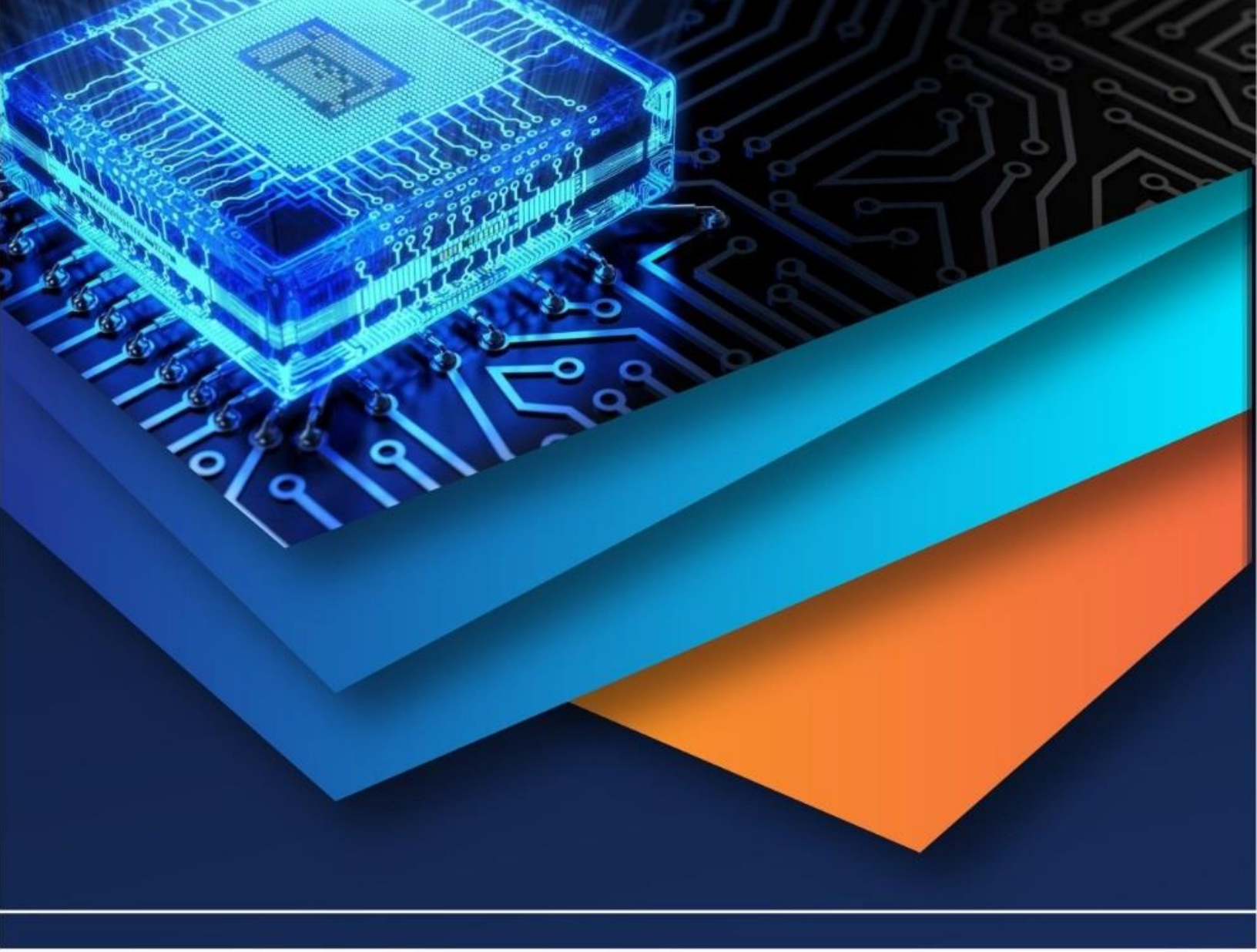
V. CONCLUSION

In conclusion the review of Gmnelia arborea is the early and recent published research article through many medicinal activities. Gmnelia arborea has been used since as ancient times to treat wide range of disease in traditional system of medicine this data of various studies proven his pharmacological properties such as cognitive, Antidiuretic, Anti-diarrheal, Anti-pyretic, Analgesic, Anti-oxidant activity, Anti-diabetic, Anti-bacterial, Anti-fungal activity, Anti-ulcer, Gastro protective effect, Anti-hyperlipidaemic effect, Wound healing activity of Gmnelia arborea.

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