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PHARMACOLOGICAL ACTIVITIES OF BOUGAINVILLEA GLABRA-A REVIEW

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ABSTRACT

Bougainvillea glabra plant is very well known for its therapeutics benefits in Indian systems of medicine including Ayurveda and Siddha and in other forms of traditional medicine worldwide for the treatment of several ailments. It observed that many traditional utilities of Bougainvillea glabra got their authentication when tested using different disease-based pharmacological models taking various extracts of roots, leaves, and root oil as test samples. Our review article focusses to pharmacological activites are anti-oxidant, anthelmintic, anti-diabetic, anti-yeast, anti-oxidant, anti-bacterial, This article can give potential research areas to explore next, and to formulate new formulation in allopathy and some traditional medicine system.

KEYWORDS: Paperflower, Bougainvillea Glabra, Antidiabetic, Anticancer Activity.

INTRODUCTION

Bougainvillea glabra, the lesser bougainvillea or paperflower, is the most common species of bougainvillea used for bonsai. The epithet 'glabra' comes from Latin and means "bald". It is an evergreen, climbing shrub with thick, thorny stems and drooping branches that are glabrous or sparsely hairy. The leaves have a 3–10 millimetre-long (1⁄8–3⁄8 in) stem. The leaf blade is ovate to ovate-lanceolate, pointed or briefly pointed, 5 to 13 centimeters long and 3 to 6 centimeters wide, sparsely fluffy hairy on the underside and bald on the top. The leaf-like bracts are purple, oblong or elliptical, pointed, 65–90 mm (2 1⁄2–3 1⁄2 in) long and about

50 mm (2 in) wide. They tower over the flowers. These grow individually in pairs or in groups of three on flower stems about 3.5 millimeters long. The crown tube is greenish, clearly angled, about 2 centimeters long, sparsely downy hairy, ribbed and points away from the flower stalk. The tip is lobed five times and forms a short, spread, white or yellowish hem. The six to eight stamens have 8 to 13 millimeter long stamens.The ovary is about 2 millimeters long, the stylus 1 millimeter and the scar 2.5 millimeters. It usually grows 3–3.5 m (10–12 ft) tall, occasionally up to 9 m (30 ft). Tiny white flowers usually appear in clusters surrounded by colorful papery bracts, hence the name paperflower. The leaves are dark green, variable in shape, up to 100 mm (4 in) long. The flowers are about 0.4 cm in diameter (the pink petal-like structures are not petals, but bracts.) B. glabra is heat and drought tolerant and frost sensitive. It is easily propagated by cuttings.It needs full sunlight, warm weather and well drained soil to flower well. The species is often used in culture, in areas with frost in glass houses, otherwise outdoors. The similar Bougainvillea spectabilis, which differs from Bougainvillea glabra by the velvety-felty underside of the leaves, is also cultivated, but less frequently. Being of medical importance, the infusion of the plant's tender leaves and bracts is used orally to treat gastrointestinal problems (diarrhoea, stomach pain), and respiratory conditions (asthma, bronchitis, catarrh, chest pain, fever, pneumonia, whooping cough).[1]

1. Antidiabetic Activity

Grace I et.ai., describes about the antidiabetic and antilipidemic effects of Bougainvillea glabra was investigated in this study using 25 male wistar rats. The rats were divided into 5 groups comprising of five animals each. These groups include a normal control (administered saline), an extract control (administered 100 mg/kg of extract) and a diabetic control (untreated group). The remaining two groups were administered 100mg/kg and 400 mg/kg of the extract respectively. The study lasted for three weeks although blood samples were obtained from the rat tails after every week. The results show that the extract significantly ($p< 0.05$) reduced the hyperglycaemia from 12±0.40 mmol/L (Diabetic Control) to 4.04±0.03 mmol/L (400 mg/kg group). Likewise, the extract significantly reduced the Total Cholesterol (TC), Triglyceride (TG) and Low-Density Lipoprotein Cholesterol (LDL-Cholesterol), while increasing the High-Density Lipoprotein Cholesterol (HDL-C). In conclusion, the observations from this study show that Bougainvillea glabra has antidiabetic effect and beneficial effects onblood lipid profile, thus justifying the use of the plant by traditional medicine practitioners for the treatment of diabetes mellitus.[2]

2. Antiyeast, Antioxidant and Anticancer Activity

Mukesh Kumar D et.al., describes about Ethanolic extracts of leaves, fruits and stem of Tribulus terrestris and leaves of Bougainvillea spectabilis were prepared and assessed for anti-yeast activity on Candida albicans and Malassezia furfur at 50 µl and 100 µl concentrations, compared with Fluconazole anti-yeast agent. The antioxidant activity was examined by various methods such as DPPH, ferrous ion reducing antioxidant power, ferrous ion chelating ability assay and cerium (IV) ion reducing power assay and compared with ascorbic acid, α-tocopherol, rutin and quercitin. The extracts were also evaluated for anticancer activity such as decatenation assay and catalytic activity assay and compared with KDNA. It was observed that the fruit of T. terrestris and leaves of B. spectabilis has flavanoid and saponin compounds by Thin layer chromatography. From the results, it is evident that ethanolic extract of fruit of T. terrestris and leaves of B. spectabilis has maximum anti-yeast activity against candida albicans at 100 µl concentration and has a potent antioxidant and anticancer activity.[3]

3. Anthelmintic Activity

M. Chinna Eswaraiah et.al., describes about The present study was designed to explore the anthelmintic activity of different extracts of leaves of Bougainvillea glabra using petroleum ether, ethyl acetate methanol and water as solvents. Various concentrations (25 and 50mg/ml) of all the extracts were tested, which involved determination of time of paralysis and time of death of the worms. It was compared with Albendazole as standard reference and normal saline as control. The study indicated the potential usefulness of Manihot esculenta against earthworm infections.[4]

4. antimicrobiano, antiulceroso, antidiarreico

Edwin et, al., describes about Con el fin de evaluar científicamente algunos de los usos tradicionales de la buganvilla (Bougainvillea glabra Choisy), se realizó el presente estudio para examinar los efectos antidiarreicos, antiulcerosos y antimicrobianos del extracto acuoso, etanólico y acetónico de sus hojas. Se probó la actividad antidiarreica en un modelo de diarrea inducida con aceite de ricino en ratas y se utilizó loperamida (3 mg/kg) como estándar de referencia. Se determinó la acción antiulcerosa mediante un modelo de úlcera inducida con alcohol y se utilizó omeprazol (10 mg/kg) como estándar. Ambos estudios se realizaron con dos niveles de dosis, 200 mg/kg y 400 mg/kg, respectivamente. La actividad antimicrobiana se estudió mediante un método de difusión en disco con una concentración de 500 µg/disco

de extracto, utilizando ofl oxacina (5 µg/disco) como estándar. Los organismos utilizados fueron Escherichia coli, Bacillus subtilis, Klebsiella pneumoniae, Staphylococcus aureus y Proteus vulgaris, y se determinó la zona de inhibición. Los extractos de plantas mostraron una significativa acción antidiarreica, antiulcerosa y antimicrobiana en el presente estudio. Los resultados obtenidos corroboran lo sostenido por los profesionales de la medicina locales.In order to scientifically appraise some of the folkloric uses of Bougainvillea glabra Choisy, the present study was undertaken to examine the anti-diarrhoeal, antiulcer and antimicrobial activities of acetone, ethanolic and aqueous extract of leaves. Anti-diarrhoeal activity was tested in Castor oil induced diarrhea model using rats and Loperamide (3 mg/kg) was used as reference standard. The antiulcer activity was determined using alcohol induced ulcer model and Omeprazole 10 mg/ kg was used as the standard. Both the studies were carried out at two dose level, 200 mg/kg and 400 mg/kg respectively. Antimicrobial activity was done by disc diffusion method at a concentration of 500 µg/disc of the extract, using ofl oxacin (5 µg/disc) as the standard. The organisms used were Escherichia coli, Bacillus subtilis, Klebsiella pneumoniae, Staphylococcus aureus and Proteus vulgaris and the zone of inhibition was determined. The plant extracts showed significant anti-diarrhoeal, antiulcer and antimicrobial activities in the present study. The results obtained support the claim of local medical practitioners.Efecto antimicrobiano, antiulceroso y antidiarreico.[5]

5. anti-nociceptive and anti-inflammatory activities

Isiaka A Ogunwande et, al., describes about Bougainvillea glabra is widely used in Nigeria for the treatment of inflammatory-related conditions, and as remedy for pain ailments.Considering the lack of scientific studies focused on chemical constituents and pharmacological activity of B. glabra essential oil, this work was designed to characterize the volatile compounds and evaluate the anti-inflammatory and anti-nociceptive properties ascribed to this plant species.The essential oil was extracted from the leaf of B. glabra by hydrodistillation in an all glass Clevenger-type apparatus and characterized by gas chromatography (GC-FID) and gas chromatography-mass spectrometry (GC-MS) on HP-5 column. The anti-inflammatory property of the essential was established by measurement of carrageenan induced rat paw edema while the anti-nociceptive activity was determined by hot plate test, according to established procedures.The essential oil was obtained in a yield of 0.08% (v/w) calculated on dry weight basis. A total of 11 compounds representing 96.2% of the oil contents were identified by GC/MS. The main constituents of the essential oil were (E)-nerolidol (31.4%), (E)-β-ionone (10.3%) and linalool (10.1%). The anti-nociceptive

property of the essential oil was statistically significant $p < 0.001$ at all doses of when compared to the control while exhibiting an activity in tandem with the standard drug. For the 1st and 2nd h, at doses of 100 and 200 mg/kg, the anti-inflammatory activity was statistically very significant ($p < 0.001$), while at 3rd h the activity declined ($p < 0.01$) at a dose of 200 mg. The activity was non-significant at the 4th h experimental duration. This is first report on the chemical constituents and biological activity of essential oil of B. glabra from Nigeria. Overall, the results herein presented sustain and strengthen the anti-nociceptive and anti-inflammatory properties traditionally ascribed to B. glabra.[6]

6. Antibacterial Activity

Gupta V et.al., describes about the aim of the present study was to evaluate and compare the antimicrobial activity of Bougainvillea glabra 'Snow White' leaves extract with Bougainvillea glabra 'Choicy' leaves extract. Bougainvillea glabra 'Snow White' is a cultivated variety of Bougainvillea glabra 'Choicy' which have white bracts with greenish veins. Antimicrobial activity of different solvent extracts of these plant leaves were tested against Gram positive and Gram negative bacterial strains by observing the zone of inhibition. Antimicrobial activity was done by disc diffusion method at a concentration of 500 g/disc of the extract, using ofloxacin (5g/disc) as the standard. The bacterial strains used in the study were Staphycococcus aureus, Bacillus subtilis, Escherichia coli, Salmonella typhii, Klebsiella pneumoniae, Proteus vulgaris, and Vibrio cholerae. Hydroalcoholic extract was more active against all bacteria. Bougainvillea glabra'snow white' was not effective against Bacillus subtilis and Micrococcus leuteus while B. glabra'choicy' was not effective against Proteus vulgaris.[7]

7. Antioxidant Activity

Neha Sahu et.al., describes about Plantare a sour s ce of large amount of drugs compromising to different groups such as antispasmodics, emetics, anti-cancer, anti-microbial etc. The WHO estimated that 80% of the population of developing countries still relies on traditional medicine, mostly plant drugs for their primary health care needs. Hence, there is an urgent need to study the screening of antioxidant properties of herbs which will be helpful in the treatment of several diseases. Antioxidants are an inhibitor of the process of oxidation, even at relatively small concentration and thus have diverse physiological role in the body. Antioxidants may be synthetic or natural. Synthetic antioxidants such as BHT and BHA have recently been reported to be dangerous for human health. Thus, the search for effective, non-

toxic natural compound with antioxidative activity has been intensified in recent years. In this present review, an attempt has been made to give information about the antioxidant activity of Bougainvillea Glabra, which is an immensely showy, floriferous and hardy plant.[8]

8. Anti-Cancer and Anti-Microbial Activity

Joshny J et.al., describes about Bougainvillea glabra, a well known and spread decorative plant in India and many parts of the world, was reported to have various medicinal properties such as anthelmentic, anti-diabetic, antiviral and insecticidal activity. We have performed the present study to focus and evaluate the antimicrobial and anticancer activity of the plant extract. We used the hydro-alcoholic extract of Bougainvillea glabra leaves for the antimicrobial studies, to test against Yeast, Gram positive bacteria and Gram negative bacteria strains by disc diffusion method. We have also estimated its maximum bactericidal activity by the same technique. The yeast used in the study was Candida albicans, while the bacteria used were Salmonella typhi as Gram negative and Staphylococcus aureus as Gram positive. And we have used Chloramphenicol as the standard drug for antibacterial test and Fluconazole for antifungal activity. The in vitro anticancer study was tested using human cancer cell line HeLa in which the cell growth inhibition was determined with the help of MTT assay. The hydroalcoholic extract of B.glabra showed significant anticancer activity with an IC50 value of 47.11µg/ml.[9]

CONCLUSION

This review paper shows all the activities of Bougainvillea glabra and the pharmacological activities like anti-bacterial, anti-cancer, etc. Extract of Bougainvillea glabra leaves contains more bioactive principles, which act against the representative human pathogens. Moreover, this reviewed article showed more pharmacological applications and helps to developing the allopathy and traditional formulations.

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