

REVIEW ON ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF *WRIGHTIA TINCTORIA* R. BR.**Dr. Amritha E.*¹, Sajeena CH¹, Dr. Shijikumar P. S.², Dr. Sirajudheen M. K.³ and Sherin A.⁴**¹Department of Pharmacognosy, Jamia Salafiya Pharmacy College, Pulikkal, India-673637.²Department of Pharmaceutical Analysis, Jamia Salafiya Pharmacy College, Pulikkal, India-673637.³Department of Pharmaceutics, Jamia Salafiya Pharmacy College, Puluikkal, India-673637.⁴Department of Pharmaceutical Chemistry, Jamia Salafiya Pharmacy College, Pulikkal. India-673637.***Corresponding Author: Dr. Amritha E.**

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ABSTRACT

Wrightia tinctoria is an ayurvedic remedy in various ailment including antioxidant and antimicrobial activity. *Wrightia tinctoria* is extensively used in Indian system of medicine is a small deciduous tree of the family apocynaceae. The plant is very useful as stomachic antidiarrhetic and diuretic used in the treatment of abdominal pain, skin disease and bilious affection. The major phytoconstituents are beta-amyrin, cycloecalenol, cholesterol, methylcholesterol. Antioxidant potential was determined by 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and 2,2-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radical action decolourisation assay also antimicrobial activity of different extract of *wrightia tinctoria* has been studied against human pathogenic bacterial strains, *E. coli*, *Bacillus subtilis*, *Streptococcus aureus* and *Pseudomonas aeruginosa* by disc diffusion method on agar. The finding showed potential antibacterial properties of extract against organisms. The result obtained appeared to conform the antimicrobial and antioxidant activity that support the ethanopharmacological uses of *wrightia tinctoria*.

KEYWORDS: *wrightia tinctoria*, antimicrobial activity, antioxidant activity. Corresponding author: Amritha E, Jamia salafiya pharmacy college, pulikkal.

INTRODUCTION

Medicinal plants are a source of good economic value all over the world. Nature has given us a huge botanical wealth and large number of diverse types of plants grows in different parts of the country. Ayurveda, unani and Siddha are systematically used nearly 1500 plants in indigenous system of medicinal field. Medicinal plants are the oldest existing medical system in the world. Use of herbal medicines in Asia represents a long history of human interactions with the environment, give better cure. Plants used for traditional medicine contain a wide range of ingredient that can be used to treat chronic as well as communicable diseases.^[1] Medicinal plants represent a great source of antimicrobial agents. Plants are used medicinally in different countries and are a source of many potent, active and powerful drugs. According to World Health Organization more than 80% of the world's population relies on traditional medicine for their primary healthcare needs and prevention of disease. Medical plants contain large varieties of chemical constituents which possess important therapeutic properties that can be utilized in the treatment of human diseases. The study of Medicinal plant are used in folklore remedies have attracted the attention of many scientists in finding solution to the

problems of multiple resistances to the existing antibiotics substance.

Most of the synthetic antibiotics now use in the market have major setback due to the multiple resistance developed by pathogenic micro-organisms against their drugs.^[2] The Modern technique and pharmacological screening procedure give new plant drugs usually find their way into modern medicines. Now a day's maximum number of plant are being screened for their possible pharmacological and therapeutical value. The plant kingdom still have many plant species containing substance of medicinal value which have yet to be discovered.^[3] The medicinal value of plants lies in many chemical substances that produce a definite physiologic action on the human body. The most important of the phytochemicals of plants are alkaloids, flavonoids, tannins and phenolic compounds.

Wrightia tinctoria (Roxb.) R.Br. containing the family of Apocynaceae is a small deciduous tree with pale grey, smooth bark, distributed in tropical Africa and Asia. It is considered to be therapeutically very effective jaundice plant in Indian medicinal system. The juice of the tender leaves and bark is used efficaciously in jaundice. It is

reported to possess aphrodisiac, anthelmintic, anti-inflammatory, astringent, stomachic and antimicrobial properties. The crushed fresh and healthy leaves when filled in the cavity of decayed tooth relieve toothache. Bark and seeds are used to cure bilious infections, psoriasis, leprosy, asthma, abdominal pain and various skin diseases.^[4] The commonly known as pala indigo plant or dyer's oleander plant of *wrightia tinctoria*.^[5] *W. tinctoria* showed that the wide hepatoprotective, anti-helminthic, antidiarrhoeal, anti-psoriatic, diuretic, anti-cancer, anti-ulcer, analgesic, antimicrobial and anti-oxidant properties. In ayurvedic system the drug action of *W. tinctoria* is described as titka, kashaya, rooksha, sita and katu. Traditionally, the oil obtained by soaking *W. tinctoria* leaves in coconut oil is used for treating psoriasis disease. Leaves when chewed alone or with salt gives cure to toothache and its young stem and bark is used as brush.^[6] During headache leaf and stem bark pastes are applied on the forehead or administered orally give relief.^[7] Stem bark paste mixed with half cup of water is administered twice a day for relief from abdominal pain. *W. tinctoria* (leaf, bark and seed) is also reported action on aphrodisiac potential and antipyretic Activity.^[8] The plant is also used to cure breast cancer.^[9]

The bark of the species is used to antidysenteric antidiarrhoeal agent and antihæmorrhagic agent. The woody stem of *wrightia tinctoria* show significant activity against wide range of bacteria and fungi. It attains resistant against microorganism. The terpenoid and flavenoid of *wrightia tinctoria* show antimicrobial activity against fungus, bacteria, virus and protozoa. Hence it is important to evaluate the cytotoxic antimicrobial and antioxidant property also identifying the active compounds present in *wrightia tinctoria* is against the antioxidant and antimicrobial agent.

Antioxidant and Antimicrobial Activity

In previous studies to attempt to determine the antioxidant and antimicrobial activity of the flower extract of *wrightia tinctoria* against the resistant clinical isolates of *staphylococcus aureus*, *Escherichia coli*, *klebsiella pneumonia* and *vibrio cholera*. Ramalakshmi *et al.*, studied fresh flower extract of *wrightia tinctoria* it screened against four bacterial strains *staphylococcus aureus*, *Escherichia coli*, *klebsiella pneumonia* and *vibrio cholera* by using agar disc diffusion assay. The result showed that antimicrobial activity was assigned by measuring the inhibition zone formed around the disc.

In antioxidant property of flower extract is determined by free radical scavenging activity of the extract based on the scavenging activity of the stable 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical. Thus the antioxidant present in the extract quenches the free radical and convert them to a colourless product. The yellow colour of test solution changes to various shades of green and blue due to the reduction of Fe^{3+} /ferric cyanide complex to ferrous form

by the antioxidant product in the extract.^[10]

Another study also provides strong evidence for the use of leaves *w. tinctoria* by agar diffusion method in Keerthipriya *et al.*, where the bacterial strain were spread on nutrient agar medium and the sample V12, chloroform callus extract were loaded. The resultant inhibition zone diameter was given antioxidant activity.

The free radical activity was performed to determine the antioxidant activity by DPPH radical scavenging activity where the synthesized silver nano particle from callus extract are dissolved in DPPH and ethanol, the absorbance was measured by using UV spectrophotometer. Due to redox property of phenol, it may be showing antioxidant activity and in plays a role in neutralizing oxygen free radical.^[11]

P. Vedhanarayanan *et al.*, present investigation gives designed to screen antimicrobial activity of dried leaf of *wrightia tinctoria*. Antimicrobial activity of chloroform, ethanol and methanol extract of *w. tinctoria* were inspected against the selected experimental pathogen such as *E. coli* and *Bacillus subtilis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* by disc diffusion method. It showed maximum zone of inhibition against various microbes. The activity mainly due to their ability to complex with extracellular and soluble proteins and to complex with bacterial cell wall.^[12] In seed extract of *wrightia tinctoria* give the antimicrobial activity which can be explained by the Nagalakshmi *et al.*, it also studied by agar cell diffusion method to explain the antibacterial activity. Where the aqueous and methanolic extract of the seed were tested against gram positive and gram negative bacterial pathogens. Methanolic extract of seed extract become effective against gram positive than gram negative and seed extract of brown and beige varieties showed maximum inhibition against *Staphylococcus citreus*. The brown methanolic seed extract was effective against *E. coli*, *P. mirabilis* and *S. marcescens*. The inhibitory effect of *w. tinctoria* seed extracts particularly against *Staphylococcus* species.

Where the antifungal study revealed that the methanolic mixture seed extract of *wrightia tinctoria* it effectively inhibited pathogenic yeast and dermatophytes. Methanolic extract of brown and beige seeds showed zones of inhibition against *T. rubrum*, *C. albicans* and *Cryptococcus* species. The methanolic extract inhibited only *Penicillium* species. Whereas, the aqueous extracts did not exhibit any antifungal property. It suggests that thus plant extracts may be used in topical formulation against dermatophyte infection.^[13]

Jyotiram A. Sawale *et al.*, give the information about the antioxidant activity of *wrightia tinctoria* leaves. Where the antioxidant property of methanolic extract of *wrightia tinctoria* was determined by measuring 2-picrylhydrazyl (DPPH) radical scavenging activity, reducing

power and ability to inhibit lipid peroxidation .methanol extract exhibited strong total antioxidant activity. The free radical scavenging activity of *W. tinctoria* extract was measured in terms of hydrogen donating or radical scavenging ability using the stable free radical DPPH.^[14]

CONCLUSION

The extensive literature survey revealed that *Wrightia tinctoria* is an important medicinal plant with diverse pharmacological and phytochemical activity. The plant shows the presence of many chemical constituents like steroids, triterpenoids, Saponins, tannins, phenols, flavonoids, glycosides, carbohydrates, alkaloids and polyphenols which are responsible for the various pharmacological and medicinal properties like Anti-inflammatory activity, Anti-microbial, Anti-oxidant, Anti cancer, Anti- diabetic, Anti-psoriatic activity etc. This plant has proved effectiveness against commonly occurring ailment and can be used for long duration for alleviation of bacterial actions. The hemopoietic, growth promoting and antioxidant activity of some chemical constituents. These features indicate that *W. tinctoria* extract had the safety potential to be consumed for a very long time in traditional medical practice in the management of various disease. *Wrightia tinctoria* bark methanol extract was found to be a potent extract and its activity is quite comparable with the standard antibiotics such as tobramycin screened under same conditions. *W. tinctoria* leaf methanol extract was also found to be effective against *Staphylococcus aureus* and *Bacillus cereus* and its activity is comparable with the standard antibiotics such as tobramycin, gentamicin sulphate, ofloxacin and ciprofloxacin.

Also the result of scavenging activities observed against DPPH, reducing power, phosphomolybdenum activities, shows that *wrightia tinctoria* as promising natural sources of antioxidant suitable for preventing free radical mediated disease.

However prolonged consumption of *W. tinctoria* in high dose can be implicated with increased risk of cardiovascular disease, liver damage, and hyperglycemia. However, evaluation need to be carried out on *W. tinctoria* in order to explore the concealed areas and their practical clinical applications, which can be used for the welfare of the mankind.

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