ISSN : 2347 - 2243

Indo - American Journal of Life Sciences and Biotechnology

www.iajlb.com
Email : editor@iajlb.com or iajlb.editor@gamil.com

Indo-American Journal of Life Sciences and Biotechnology

Vol. 18, Issue. 4, DEC 2021

ANTIBACTERIAL ACTIVITY OF LEAFEXTRA CTSOF AGIALITISROT UNDIFOLIA

ManasKumarYogi1*D.Uma2, A.Srihitha3

Abstract :agar well diffusion method was used to evaluate the antibacterial activity of Aegialitisrotundifolia leaf extracts against Escherichia coli MTCC (727), Enterobacteraerogen MTCC (111), Klebsiella pneumonia (9544), and Bacillus cereus (1272), as well as against Pseudomonas aeruginosa (741), Proteus mirabilis (9493), and Staphylococcus aureus (96). Most effective antibacterial activity was found to be in leaf extracts in methanol and ethyl acetate; It was determined that the MIC (Minimum Inhibitory Concentration) was 100, 200, 300, and 400 mg/100 ml for the antibacterial activity of the extracts that were shown to be effective. The MIC varied from 100 g/100 l to 400 g/100 l for several test organisms. Leaf extracts from Aegialitisrotundifolia have been shown to have a wide range of applications.

Keywords:The leaves, Aegialitisrotundifolia, Efficacy against germs.

1.**Introduction**

As a result of their introduction, antibiotics have become one of the most essential weapons in the battle against bacterial illnesses. Plasmid-mediated resistance is becoming more common in several pathogens. Natural chemicals from plants and microbes are needed to meet this need. For as long as we can remember, plants have been a source of inspiration for new medicinal molecules. Several bacterial infections may be controlled using natural compounds obtained from plants, which operate as a storehouse of powerful chemotherapeutics and chemotherapeutic agents. Bioactive substances such as peptides and glycosides, alkaloids and terpenoids as well as flavonoids have been shown to have antimicrobial properties against bacterial, fungal, and viral infections in several investigations (Jonathan et al., 2003, Khan et al., 2001, Perez et al., 2003).

As a result, mangroves can only be found in warm regions where they may grow and thrive in the presence of a steady supply of worms.More than a dozen nations and territories are home to them, although they are mostly restricted to the area between the equator and the Tropic of Cancer (Bandaranayake 2002). Certain bioactive chemicals produced by medicinal plants react with other organisms in the environment to suppress bacterial or fungal development. Medicinal plants' antimicrobial capabilities are increasingly being reported from throughout the globe (Rai et al., 2010).

[1,2,3]Dept.ofCSE,PragatiEngineeringCollege(A),Surampalem,E.G.Dist,A.P.,India

[1]manas.yogi@gmail.com,[2]umadarapu03@gmail.com,[3]ayyagarisrihitha@gmail.com

In the past, mangrove plant extracts have been widely utilised to treat a variety of health issues. In recent years, plant-derived compounds, which have a wide range of uses, have attracted considerable attention. Biochemically, mangroves are a one-of-a-kind ecosystem, generating a diverse range of new natural compounds. Antiviral, antibacterial, and antifungal chemicals are found in mangroves and their companions (Varahalarao et al., 2009). Some research in the field of pharmacology have described the effects of mangrove extracts on a variety of bacteria, including the Shigella, Staphylococcus, and Pseudomonas species (Abeysinghe et al., 2006, Ravikumar et al., 2010). It has also been used for extraction with other solvents such as Ethanol (ethanol) and chloroform (chloroform) (Abeysinghe et al., 2006).

Mangrove plants, on the other hand, haven't been widely examined for their antibacterial properties like most other plant species.

Plumbaginaceae is the family that includes Aegialitisrotundifolia, a mangrove tree.

Different organic solvents were used in this work to extract the mature and young leaves of Aegiatisrotundifolia to test their antibacterial properties against certain strains of M. tuberculosis (MTCC).

1. Substances and procedures

To begin with, there is the plant material.

Aegialitisrotundifolia leaves, mature and juvenile, were taken from the Nagayalanka mangrove forest in Krishna district, Andhra Pradesh, India, between latitude 150151-15055 N and longitude 800451-810 00 t. Surface sterilisation with 0.01 percent mercuric chloride solution was performed on the obtained plant materials. For seven days, the leaves were cut into little pieces and dried in the shade.

2.**2 Extraction:**

Methanol, Ethyl acetate, Chloroform, and Acetone were used to remove leaves from the plant material overnight at room temperature. There is a lot of evidence to support this claim (Choudhury and colleagues, 2005). To extract the active chemicals into the solvent, the contents of each flash were exposed to reflux for 6-8 hours at temperatures below the boiling points of the corresponding solvents, namely Acetone (550C), Chloroform (770C), Ethyl Acetate (770C), and Methanol (650C). Vacuum filtration and vacuum distillation were used to purify each extract. In order to remove the volatile solvent, the concentrated extracts were incubated at 370 degrees Fahrenheit for 3-4 days. To get a final concentration of 10 mg / 100 l, 100 mg of dried plant extract was dissolved in 100 l of 1:10 diluted DMSO (in sterile distilled water) (Nkere et al., 2005)

2.1 **Measuring the action of an antibiotic**

Bacterial strains employed in this investigation included Escherichia coli, Enterobacteraerogens, Klebsiellapneumoniae, Bacillus cereus, Bacillus subtilis, Pseudomonas aerugenosa, and Staphylococcus aureus. Using the agar well diffusion technique, extracts were evaluated for their antibacterial properties against the bacteria, and the zones of inhibition were assessed. The average and standard deviation of inhibition were computed for each experiment in triplicate. rifampicin's standard concentration of 10 micrograms per 100 microliters was used to compare the inhibition zone (Ahmad-rera et al., 2005).

The MIC is determined in step 2.2.

The reconstituted extract in DMSO was serially diluted in Nutrient broth medium to obtain concentrations of 100, 200, 300, 400, and 500 g/100 ml in order to determine the Minimum Inhibitory Concentration (MIC) using the broth dilution assay technique.

This is what happened:

Extracts of Ethyl Acetate Leaf were not effective at 300 g but 400 g may cause an inhibition of up to 70%, which might be deemed successful.

When it comes to Klebsiellapneumoniae, extracts from acetone or chloroform have little impact. Leaf extracts of 100 and 200 g in methanol exhibited no significant impact. 300 g of extract also showed no significant impact on bacteria. Whereas, 400 g might result in a 16 mm zone of inhibition that falls on 72.1 percent, which is deemed effective.

The 300 g dose of ethyl acetate extract proved ineffective. 100 and 200 g extract had no impact on the test subjects. When compared to 400 g extract, the 16 mm inhibitory zone produced by the latter was only 63.6 percent efficient in the antibacterial action. Bacteria respond to acetone and chloroform.

The effects of 100 g and 200 g methanol leaf extracts on Enterobacteraerogenswere not favourable. It is possible to establish a 12-mm zone of inhibition with 300 g extract, whereas 400 g may produce a 14-mm zone of inhibition on Staphylococcus aureus that is 87.2 percent effective. Methanol 100 and 200 micrograms of leaf extract did not have a positive impact. The inhibitory zone may be formed by 300 g at a concentration ranging from 78.9 to 83.3 percent. It is possible that the 400 g leaf extract might be more successful in establishing a 100% inhibitory zone.

For example, ethyl acetate extracts of 300 and 400 g yielded between 12 and 13 millimetres with 66.6 and 72.2 percent inhibitory zones respectively. The antibacterial action of ethyl acetate extract at a greater concentration of 400 g is thus deemed promising. This organism was unaffected by concentrations as low as 100 or 200 g.

If you're looking for an effective treatment for Proteus mirabilis, you'll want to use the 400-microgram methanol leaf extract instead of the 300-microgram extract, which can only create 16- and 18-millimeter inhibitory zones.

At 100 and 200 g, the lesser amounts had no impact. This leaf extract, which included 400 micrograms of methanol, showed great promise in achieving an inhibition zone of 90 percent, making it more efficient than other leaf extracts.

Concentrations of methanol leaf extracts of 300 g and 400 g had the greatest impact on Bacillus cereus, affecting the bacteria between 15 and 17 mm in diameter, or 73.6 to 89.4% of the zone of inhibition that could be termed effective. Anyhow, the 400 g methanol concentration proved to be really beneficial. At a dosage of 300 g, the ethyl acetate impact was negligible, while leaf extract at a concentration of 400 g showed a zone of inhibition of 68.4 percent, but was not as efficient as methanol extract. Bacillus cereus is unaffected by acetone or chloroform extracts.

Methanolic extracts of 100 and 200 mg of A.rotundifolia failed to produce a zone of inhibition in any of the bacteria tested. In contrast to 300 g, the 400 g concentration has superior effects. Leaf extracts of ethyl acetate and methanol have been studied in comparison to the impact of control Rifampicin and in percentage of creation of the zone of inhibition in comparison to Rifampicin and ethyl acetate

Acetone and chloroform had little impact on E.coli bacteria, and both concentrations of 300 g and 400 g are almost identical in producing the inhibitory zone, which ranged from 15 mm to 16 mm and 78% to 84%. Ethyl acetate leaf extracts were able to generate a 12 mm and 14 mm zone, respectively, which was encouraging. This means that 400 g of each of the 400 methanol and 400 ethyl acetate leaf extracts might be used to produce the inhibitory zone.

Methanol leaf extract of 400 g was shown to be more promising in the study of Bacillus subtilis

compared to the lower concentrations of ethyl acetate and methanol leaf extracts (57 to 68 percent vs. 15 mm).

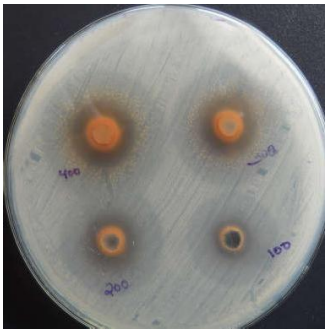
Leaf extracts of ethyl acetate at concentrations of 100, 200, and 300 g exhibited no impact, while the 300 g concentration was ineffective as well. The antibacterial activity of 400 g was found to be highly promising, yielding an 81.2 percent zone of inhibition. Neither acetone nor chloroform had any impact on the microorganisms.

This may be regarded to be a successful method for creating the zone up to 20 millimetres in 75 percent of cases using the methanol extract of Pseudomonas aeruginosa.

All concentrations of Ethyl acetate extracts, even 400 g, failed to have an impact since the inhibition zone is only 50%. For the establishment of the inhibitory zone, acetone and chloroform extract were ineffective. Staphycoloccusaureus, Proteus mirabilis, and Bacillus cereus are all susceptible to the antibacterial effects of Aegialitisrotundifolia leaf extract at methanol-400 g.The findings are in line with those of Chowdary, S. et alprevious .'s research (2005). According to Padmakar and Ayyakanna's research (1977). Following S. aureus, P.auriginosa was shown to be the most resistant bacterial pathogen, and the data support this conclusion..

Aegialitisrotundifolia may have an antibacterial effect based on the results of this investigation. To fully understand the antibacterial activity of phytochemicals and the active principle that underlies it, more research is required in light of current human illness. In order to produce extracts and fractions on a wide scale with predictable antibacterial effectiveness, standard operational products may be designed that are economically practical..

ANTIBACTERIALACTIVITYOFAGIALITISROTUNDIFOLIA,METHANOLICLEAFEXTRACTSONBACTERIAAT100, 200,300AND400µg/mlCONCENTRATIONS.



FIGURENO.1 FIGURENO.2

Pseudomonaaurugenosa ProteusmirabilisFIGURENO.3

Staphylococcusaureus

Tableno.1:EffectofAgialitisrotundifolialeafExtractsonPathogenicBacteria

µl=microliters µg=microgram*DMSO–DimethylSulphoxideEachreadingisanaverageofthreereplicates

S.No	Extract/ Std.Antibiotic	Con.oftheextractinµg	Zoneofinhibition(mm)							
			Enterobactera erogenes	*Klebsiellapneumonia*	*Escherichiacoli*	*Bacillus cereus*	*Staphylococcusaureus*	*Bacillussubtilis*	*Proteusmirabilis*	*Pseudomonasaeruginosa*
1.	Methanol	100	9.3	9.6	9.6	9.6	10.0	10.3	10.6	12.6
		200	10.6	11.0	11.3	12.0	12.0	12.6	14.0	18.3
		300	11.6	13.0	13.0	14.3	14.6	15.3	16.0	20.0
		400	14.0	15.0	15.6	16.0	17.0	17.0	18.0	25.0
2.	Ethyl Acetate	100	0	0	0	0	0	9.3	10.0	10.0
		200	10.0	10.0	10.0	10.0	10.3	10.6	10.6	11.0
		300	10.0	10.0	11.3	12.0	12.0	12.0	12.6	13.0
		400	13.0	13.0	13.0	13.3	14.0	14.0	14.3	15.0
3.	Rifampicin	100.0	16.0	22.0	19.0			19.0	18.3	20.6	29.6
4.		DMSO*	100 µl	0	0	0	0	0	0	0	0

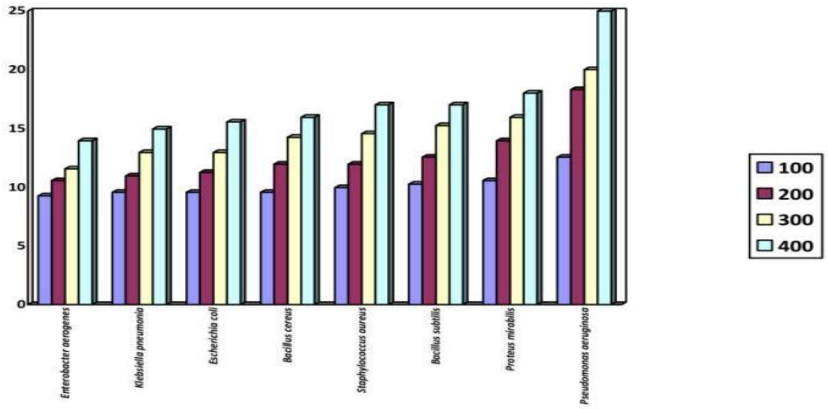


Figure – 4 : Antibacterial activity of Methanolic Leaf Extracts of Aegialitis rotundifolia

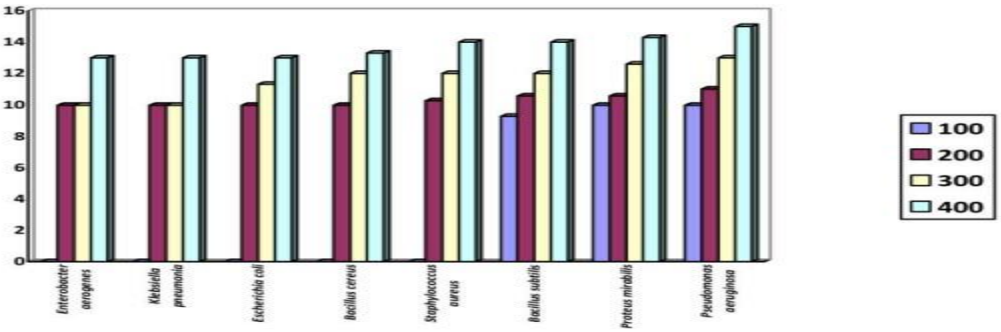


Figure – 5 : Antibacterial activity of Ethyl Acetate Leaf Extracts of Aegialitis rotundifolia

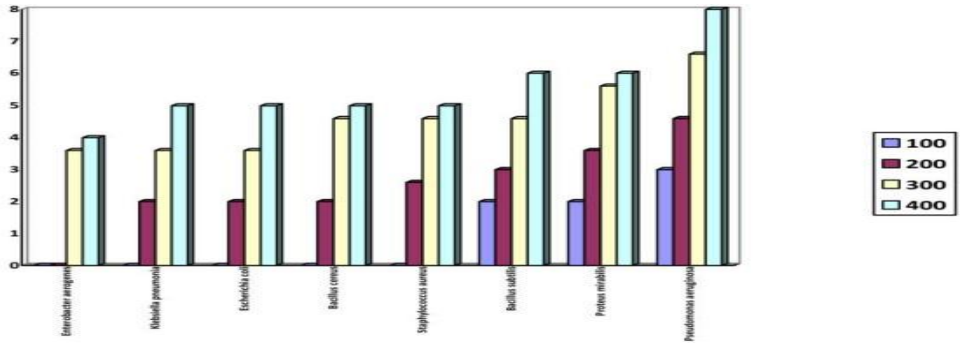


Figure – 6 : Minimum Inhibitory Concentration of Methanolic Leaf Extracts of A.rotundifolia

Table no. 2 : MIC values of Agialitis rotundifoliae leaf extracts on certain Bacteria

µl = micro liters µg= micro gram *DMSO – Dimethyl Sulphoxide

S. No.	Extract/ Std. Antibiotic	Con. of the extract in µg	Plant *Aegialitis rotundifolia*. Zone of inhibition in mm for plant extract / standard antibiotic							
			Enterobacter aerogenes	*Klebsiella pneumonia*	*Escherichia coli*	*Bacillus cereus*	*Staphylococcus aureus*	*Bacillus subtilis*	*Proteus mirabilis*	*Pseudomonas aeruginosa*
1.	Methanol	100	0	0	0	0	0	2.0	2.0	3.0
		200	0	2.0	2.0	2.0	2.6	3.0	3.6	4.6
		300	3.6	3.6	3.6	4.6	4.6	4.6	5.6	6.6
		400	4.0	5.0	5.0	5.0	5.0	6.0	6.0	8.0
2.	Ethyl Acetate	100	0	0	0	0	0	0	2.0	2.0
		200	2. 0	2.0	2.0	2.0	2.0	2.6	3.0	3.6
		300	3.6	3.6	4.0	4.0	4.0	4.0	5.0	5.0
		400	4.0	4.0	4.0	4.0	4.0	4.0	5.0	5.0

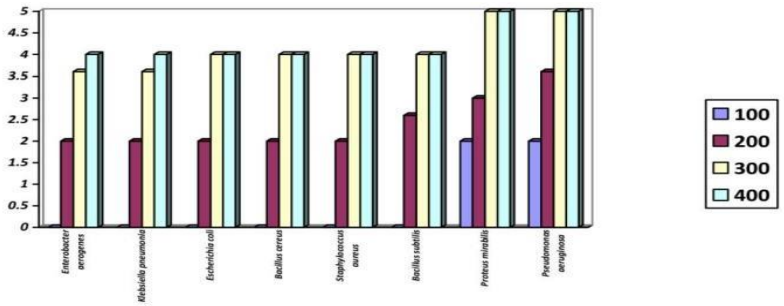


Figure – 7 : Minimum Inhibitory Concentration of Ethyl Acetate Leaf Extracts of A.rotundifolia

REFERENCES:

Different mangrove plant extracts evaluated for antibacterial activity by Abeysinghe P.D., Wanigatunge R.P., and Pathirana R.N. The Ruhuna Journal of Science, 2006;1:104-112.

Abbas S. GhodamerzaAbbass S. Ahmad-reza S. Iranshahi M Roohollah M Hossein J Identification of an antibacterial component in Ferula persicavarperica roots by bioassays. DARU 2005;13:17-9. DARU 2005

Bioactivities, bioactive substances, and chemical elements of mangrove trees are studied by Bandaranayake WM. Wetlands Ecology and Management, 2002; 10: 421-452.

Choudhury S, Sree A, Mukherjee S.C., Patnaik P, Bapuji M. are the authors of this study. Extracts of certain marine algae and mangroves have been shown to have antibacterial activity in vitro against fish infections. Journal of Asian Fisheries 2005;18
:285-94.

Aspergillusnivalis (Zingiberaceae) essential oils have been shown to have antifungal properties. Biopharmaceutics 2003;41:392-97.

In Natural Product Sciences, 2001, Khan M, Kihara and Ololoso A.D. reported broad-spectrum antibacterial activity of the leaves, stem and root barks of Myristicasubabulata.

Antibacterial screening of Picralimanitida root, seed, and stem bark extracts, Nkere CK, Ireogby CU. Biotechnology in Africa 2005;4:522-6.

In vitro antibacterial activity of entire root extracts of Synclisascabrida by S. Okoli and C.U. Ireogbu. The African Journal of Biotechnology, 2005; 946-52.

Ayyakkannu, K. and Padma Kumar, R. Antiviral Activity of Marine Algae and Mangroves. Tromsoe (Norway) hosted the third international conference on marine biotechnology in 1977, which was held between the ages of 98 and 99.

Compounds extracted from plants have antiviral properties. Pharmaceutics and Biotechnology There are four authors in this study: Rai P.S; Mehta, S; Gupta LK; and Walia G (all from India). Trichosanthesdiocia, a new antimicrobial agent. Pharmaceutical Research and Therapeutics 2010;1-9

Muthu-raja M, Sivaperumal P, and Gnana design M are some of the other authors on this page. Select fish infections are resistant to the antibacterial action of mangrove leaf Excoecariaagallocha. 2(5): 211-213 in the Asian Journal of Medical Science

A study by VarahalaRao (V) and Chandrasekhar Naidu (K).Rhizophora Conjugate, a saltwater mangrove plant active in vitro, was studied. Int'l Journal of Pharmaceutical Technology & Development 2009;

4th (4): 588- 1600.