EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 11
Issue: 5
135-138
Year: 2024

COMPARATIVE ANTIMICROBEAL STUDY OF *TECOMELLA UNDULATA* WALL ROOTS BARK AND STEM BARK EXTRACT IN VARIOUS SOLVENTS

***Sonar S. A., Bhor I. S. and Dr. M. D.**

College of Ayurved and Research Centre, Nigdi, Pune (India).

***Corresponding Author: Sonar S. A.**
College of Ayurved and Research Centre, Nigdi, Pune (India).

Article Received on 29/02/2024 **Article Revised on 19/03/2024** **Article Accepted on 09/04/2024**

ABSTRACT
The Present study the dried root bark and stem bark of *Tecomellaundulata* Wall. extract in various solvent such as water, PET ether, ethyl acetate, ethyl alcohol, methyl alcohol, chloroform in soxhlet apparatus. All extract were used for antifungal investigation. Theantifungal activity is done in Potato dextrose agar medium against microorganism like *E-coli, Bacillus Subtilis, Pseudomonas aeruginosa, Staphylococcus aureus, Xanthomonascitri*. For this study disc diffusion method is used. It shows considerable activity as compare to standard drug (Ciprofloxacin). The results of the present study provide scientific information for the popular use of tecomellaundulata Wall. root bark and stem bark.

KEYWORDS: *Tecomellaundulata*Wall. rootbark, stem bark phytochemicals, antimicrobial activity.

INTRODUCTION
Tecomellaundulata possesses significant anticancer activity, hepatoprotective, analgesic activity, anthelmintic, antibacterial, antifungal activity, mild relaxant, cardio tonic activities and used in the treatment of syphilis and eczema, antiseptic, antiviral, astringent, bitter, blood purifier, cholagogue, cardiotonic, choleretic, hepatoprotective, muscle relaxant, pungent, refrigerant and relaxant. It is used to treat abdominal pain, anorexia, ascites, blood disorders, cough, diabetes, eczema, flatulence, gonorrhea, gout, jaundice, hepatitis, leucoderma, liver diseases, obesity, piles, spleen disorders, syphilis, tumors, urinary disorders and worm infestations.[1-8] Different medical plants have been used for years in daily life to treat disease all over the world. Plants play a vital role in human and animal life as source of food and medicine. Medicinal plants play important role in primary health care. Major part of potential of medicinal plants is yet to be discovered in health care. Many plant extract of higher plants show antimicrobial activity, but there are many medicinal plants whose activities yet to be discover. Many infectious diseases have been treated with known herbal remedies or single plants throughout the history. The increasing failure of chemotherapeutics and increasing antibiotic resistance shown by pathogenic microbial infectious agent has led to screening of several medicinal plants for their potential antimicrobial activity.[9,10] Antibiotics are sometimes associated with adverse effects including hypersensitivity, immune-suppression and allergic reactions.[11] The researcher studied the antimicrobial activity of ethanol extract of leaf and flower of *Spathodeacampanulata P*. Beauv and concluded that the ethanol extracts of both Leaf and flower extract of respective *plant* exhibit significant antibacterial activity against pathogenic bacteria.[12] Leaf extracts of *Aeglemarmelos*have been tested for antimicrobial activity against some bacterial species include Gram-positive bacteria and Gram- negative bacteria.[13,14] The leaf extract of *Meliaazedarach* L. in various solvents were tested against human pathogens using agar well diffusion method and Minimum inhibitory concentration.[15] The researcher evaluate the phytochemical and antimicrobial activity of twelve medicinal plants of ethanolic extract of plants were evaluated using well diffusion method against pathogens.[16] Antimicrobial activities of four traditional medicinal plants from Nepal were assessed by cold percolation method. Te result showed potential antibacterial effects of *O. corniculata*extracts against bacteria.[17] The extracts of *veronica biloba*in different solvent were used for antimicrobial activity.[18]

The researcher studied the Phytochemical present in methanolic extract of the stem bark led to the isolation of ten compounds characterized by IR, UV, NMR techniques and confermed the compounds present in sample.Sample led to the isolation of aliphatic and aromatic esters, β-sitosterolarabinosyldiester, naphthoquinones and vanillic acid dodecaglycoside.[19] Ravi Alvala et.al have been studied the ethylacetate extract of Tecomellaundulata bark shows anti-obesity

and metabolic disorders.[20] Rana et.al investigate that among the methanolic extracts tested, the methanolic extract of the bark parts of *Tecomellaundulata* possess hepatoprotective activity against CCl4 intoxication in rats.[21] The elemental composition, Copper (Cu), Zinc (Zn), Manganese (Mn), Iron (Fe), Calcium (Ca), Chromium (Cr), Sodium (Na), Nickel (Ni), Lead (Pb) and Cadmium (Cd) in different parts (leaf, bark and flower) of the plant *Tecomellaundulata* (Seem) were investigate. All elemental estimations were done using Inductively Coupled Plasma - Atomic Emission Spectrometer.[22] The qualitative phytochemical presents in stem barks of tecomellaundulata in various solvents investigated by number researchers.[23-24] Number of phytochemical studies were performed to investigate the composition of different plant extracts, leading to the isolation and identification of pharmacologically relevant compounds such as iridoidglucoside, naphthoquinone, phytosterols, fatty alcohol, flavonoid glycoside, flavonol, fatty acid and triterpenoids.[25-31]

After review of literature survey the detail antifungalstudy of *Tecomellaundulata* Wall root bark and stem bark under identical set of experimental condition is still lacking. It was thought of interest to study the antifungalactivity presents in *tecomellaundulata* Wall. Root bark and stem bark under suitable condition.

MATERIAL AND METHODS

The root bark and stem bark of *Tecomellaundulata*Wall. were collected from medicinal plant Garden of Shahada Dist. Nandurbar. All the reagents used for preparation of following media chemicals were A.R. grade and were manufactured by Hi-media, Mumbai and Qualigens, India. Following microorganism were selected for the study *Aspergillusflavus and Candida albicans* These microorganisms were obtained from standard laboratory maintained in National Chemical laboratory Pune. MGYP medium containing (gL-1): malt extract- 3.0, glucose- 50 to 350, yeast extract- 3.0 and peptone- 5.0, pH- 6.8.[16]

Potato dextrose agar medium: - containing (g/L): potato infusion 200.0; dextrose 20.0 and agar15.0.[33]

METHOD

Phytochemical are investigated by qualitative analysis.[25-31]

Antibacterial activity: The plates were prepared using Nutrient agar allowed to solidify and dry. Then a 0.1µl microbial suspension was inoculated at the labeled spot (disc) and plates were incubated at 370C for 24hr. The results were read by the presence or absence of growth of organism.[34]

RESULTS AND DISCUSSION

Antifungal activity of *tecomella undulate wall*.root bark and stem bark after 24 hrs.

Extract	*Aspergillusflavus*	*Candida albicans*	*Aspergillusflavus*	*Candida albicans*
	Root bark(TR)		Stem bark(TS)	
Ethyl Alcohol	8	7	9	8
Methyl Alcohol	6	7	6	-
Water	-	-	-	10
Ethyl Acetate	10	10	12	7
(Fluconazole) (1000 µg/ml)	22	19	22	19
+ ve control (Distilled water)	+ ve	+ ve	+ ve	+ ve

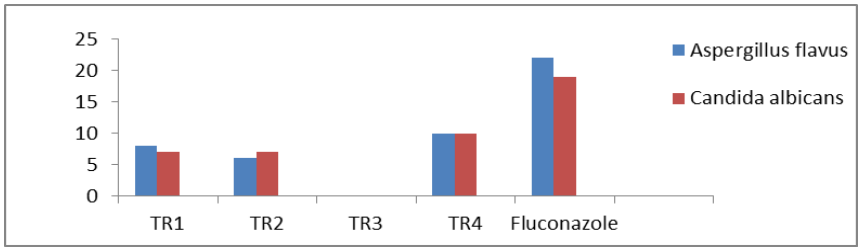


Figure 1: Antifungal activity of Root bark.

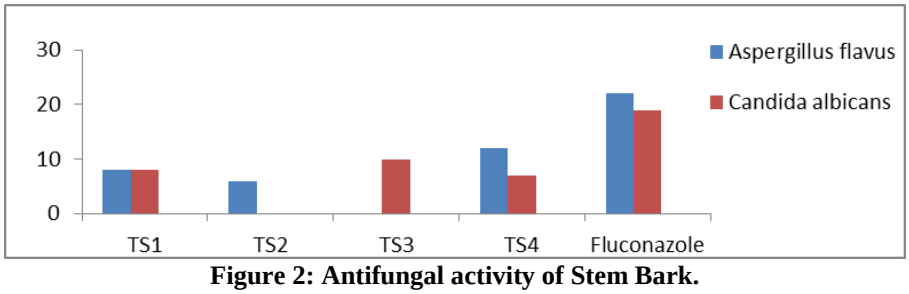
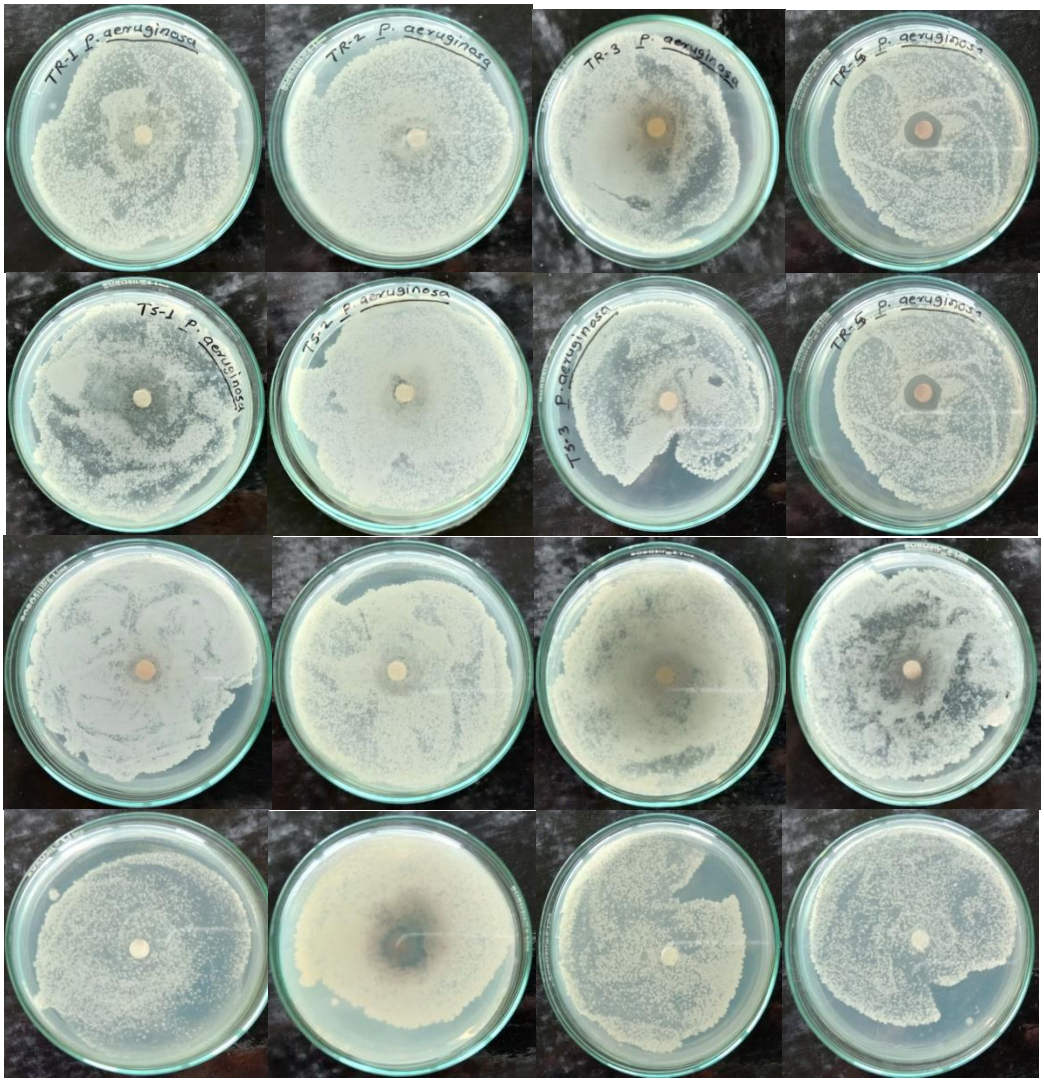


Figure 2: Antifungal activity of Stem Bark.



The result of antifungal activity oftecomellaundulataroot bark and stem bark in various solvents shows in table. The highest antifungal activity in root bark in ethyl acetate with the zone of inhibition (10 mm) was seen against both fungi species. The lowest antifungal activity with the zone of inhibition (7mm) was seen against Candida albicansstrains by methyl alcohol and ethyl alcohol root bark. The zones of inhibition from 7 to 10 were seen against both species by ethyl alcohol, methyl alcohol, water and ethyl acetate respectively. The zone of inhibition of 8 mm, 6 mm, 0 mm and 10mmwere seen against Aspergillusflavusby ethyl alcohol, methyl alcohol, waterand ethyl acetate respectively in root bark. The zones of inhibition of 12 mm were seen against P. aeruginosa strains by ethyl acetate. The zone of inhibition of 7 mm, 7mm, 0mm and 10mm were seen against Candida albicansby ethyl alcohol, methyl alcohol, water and ethyl acetate respectively in root bark. The zone of inhibition of 9 mm, 6 mm, 0 mm, and 12mmwere seen against Aspergillusflavusby ethyl alcohol, methyl alcohol, water and ethyl acetate respectively in stem bark. The zone of inhibition of 8 mm, 0 mm, 10 mm, and 7mm were seen against Candida albicans by ethyl alcohol, methyl alcohol, water and ethyl acetate respectively in stem bark.

CONCLUSION

Ethyl acetate extract of root bark shows more antifungal activity against Aspergillusflavus than other solvent extract. Ethyl acetate extract of root bark shows more antifungal activity against Candida albicans than other solvent extract. Water extract of stem bark shows more antifungal activity against Candida albicans than other solvent extract. Aspergillusflavus.

ACKNOWLEDGEMENT

The Authors is thankful to Prin. Dr. RaginiPatil, College of Ayurved and Research Centre, Nigdi, Pune (India) for kindly cooperation.

REFERENCES

1. Anonymous, "*The Wealth of India; Raw materials*". NISCAIR, CSIR, New Delhi, 2005; 10: 130-133.
2. R. Dhir and G.S. Shekhawat, "Critical review on *Tecomellaundulata*: a medicinally potent endangered plant species of Indian Thar desert",

International Journal of Current Research, 2012; 4(6): 36-44.
3. Ahmad F, Khan RA, Rasheed S. Preliminary screening of methanolic extracts of *Celastruspaniculatus*and *Tecomellaundulata*for analgesic and anti- inflammatory activities. *J Ethno pharmacol*, 1994; 3: 193-198.
4. S.S. Katewa and P.K. Galav, "Traditional herbal medicines from Shekhawati region of Rajasthan," *Indian Journal of Traditional Knowledge*, 2005; 4: 237-245.
5. Kirtikar KR, Basu BD. Indian Medicinal Plants, Vol III, 2nd ed., International Book Distributors, Dehradun, 1980; 1842-43.
6. A.K. Meena and M.M. Rao, "Folk herbal medicines used by the Meena community in Rajasthan," *Asian Journal of Traditional Medicine*, 2005; 5(5): 19-31.
7. Khatri A, Garg A. Agrawal SS. Evaluation of hepatoprotective activity of aerial parts of *Tephrosiapurpurea L*. and stem bark of *Tecomellaundulata*. *J Ethno Pharmacol*, 2009; 122(1): 1-5.
8. Parekh JJ, Chanda DS. Efficacy of aqueous and methanol extracts of some medicinal plants for potential antibacterial activity. *Turk J Biol*, 2005; 29: 203-210.
9. Colombo ML, Bosisio E. Pharmacological activities of Chelidoniummajus L (Papaveraceae). Pharmacol Res., 1996; 33: 127-134.
10. Iwu MW, Duncan AR, Okunji CO. New antimicrobials of plant origin. In: Janick J. ed. Perspectives on New Crops and New Uses. Alexandria, VA: ASHS Press, 1999; 457-462.
11. Ahmad I, Mehmood Z, Mohammad F. J Ethnopharmacol, 1998; 62: 183–193.
12. Rajesh Kowti, Harsha. R, Mohammed Gulzar Ahmed, Hareesh AR, Thammanna Gowda SS, Dinesha R, Satish Kumar BP, Irfan Ali M, Research Journal of Pharmaceutical, Biological and Chemical Sciences, RJPBCS, 2010; 1(3): 691-698.
13. Dr. K. Saravanasingh, M.D. (S)1, P. George Frdrik2 and Dr. M. Ramamurthy, M.D.(S), Int. J. Adv. Res. Biol. Sci., 2016; 3(2): 321-328.
14. Karumaran S., Nethaji S. and Rajakumar R., *Adv. Appl. Sci. Res.*, 2016; 7(3): 205- 208.
15. AntaraSen and AmlaBatra, *Int J Curr Pharm Res*, 2012; 4(2): 67-73.
16. *PreetiGauniyal, UdayVir Singh Teotia*, Int. J. Pharm. Med. Res., 2014; 2(1): 21-27.
17. SaritaManandhar, ShisirLuitel, and Raj Kumar Dahal, Hindawi Journal of Tropical Medicine, 2019; 1-6.
18. Amir Hassan and HimayatUllah, Hindawi Journal of Chemistry, 2019; 1-7.
19. Mohammed Ali, HameedHasanAbra, Shahnaz Sultana1, ShowkatRassol Mir, Modern Organic Chemistry Research, 2017; 2(4): 159-171.
20. RaviAlvala MallikaAlvala, VenkateshSama, Sriram Dharmarajan, Jeankumar VariamUllas, Madhava Reddy B, Journal of Ethnopharmacology, 2013; 148: 441–448.
21. M.G. Rana, R.V.Katbamna, A.V. Dudhrejiya, Dr. N.R. Sheth., *Pharmacologyonline*, 2008; 3: 674-682.
22. Saraf Aparna and SankhlaShweta, Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2013; 4(4): 600-607.
23. Bhardwaj, N. K., Khatri, P., Ramawat, D., Damor, R. and Lal, M. Pharmacognostic and phytochemical investigation of bark of *Tecomellaundulata* Seem. Int. J.Pharm. Res. Dev., 2010; 3: 1-10.
24. Goyal, R., Sharma, P.L. and Singh, M. Pharmacological potential of *Tecomellaundulata*in acute and chronic inflammation in rats. Int. J. Pharm. Sci. Res., 2010; 1: 108-114.
25. Singh P, Khandelwal P, Hara N, Asai T, Fujimoto Y. Radermachol and Naphthoquinone derivatives from Tecomellaundulata: Complete 1H and 13 C NMR assignments of radermachol with the aid of computational 13C shift prediction. Indian J Chem, 2008; 47B: 1865-1870.
26. Verma KS, Jain AK, Gupta SR. Structure of undulatin: New iridoid glycosides from Tecomellaundulata. PlantaMed, 1986; 52: 359-362.
27. Joshi KC, Singh P and Pardasani RT. Quinones and other constituents from the roots of Tecomellaundulata. PlantaMed, 31: 14-16.
28. Taneja SC, Bhatnagar RP and Jiwari HP. Chemical constituents of flowers of Tecomellaundulata. Indian J Chem, 1975; 13: 427- 428.
29. Randhawa GS, Mukhopadhyay A. Floriculture in India. Allied Publication (p) Ltd: Mumbai, 2004; 225-226.
30. Khare CP. Indian Herbal Remedies, Rational western therapy, Ayurvedic and other traditional usage. Botany. Society of new age herbals: New Delhi (India), 2004; 67.
31. Mukerji AK. Triacontanol and triterpenes from Tecomellaundulata, xi world forestry congress. Turky, 1977; 3: 1.
32. Experiments in Microbiology, Plant Pathology and Biotechnology, K.R. Aneja, Published by New Age International (P) Ltd., 2005.
33. Boddireddy Sridevi and M. A. SingaraCharya, African Journal of Biotechnology, 2011; 10(22): 4624-4630.
34. Izzet Şener, MahmutGür, DidemVerep, Kerim Güney, Ergin Murat Altuner Indian Journal of Pharmaceutical Education and Research, 2017; 51: 3.