IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals
ISSN 2349-7203
HUMAN

Human Journals
Research Article
August 2020 Vol.:19, Issue:1

Phytochemical and Antibacterial Studies of *Shorea robusta Gaertn* and *Butea monosperma (Lam) Taub.* of Jharkhand

IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

Bishnu Prasad[1*], Agatha Sylvia Khalkho[2]

[1]Department of Botany, Ranchi University, Ranchi. India.*

[2]Department of Botany (Centre for Biotechnology), Marwari College, Ranchi University, Ranchi, India.

Submission: 27 July 2020
Accepted: 02 August 2020
Published: 30 August 2020

Keywords: *Shorea robusta*, *Butea monosperma*, Phytochemicals, *Escherichia coli*

ABSTRACT

Shorea robusta and *Butea monosperma* were selected from Ranchi district of Jharkhand in India to determine the antimicrobial activities. Phytochemical analysis was performed by the standard methods and antibacterial activities have been explored on Gram negative bacteria *Escherichia coli.* The antibacterial tests were done by Agar Well Diffusion Method. Ethanolic extracts of Plant organ Bark shows the Zone of Inhibition. Test explored the three different concentrations that are 100%, 50% and 25%. The zone of inhibitions expressed the test sample extracts was ethno medicine.

HUMAN JOURNALS
www.ijppr.humanjournals.com

INTRODUCTION

Plants produce a diverse range of bioactive molecules, making them rich sources of different types of medicines[1]. The medicinal plants are useful for healing as well as for curing of human diseases because of the presence of phytochemical constituents[2]. Phytochemicals are naturally occurring in the medicinal plants, leaves, vegetables and roots that have defense mechanism and protect from various diseases. *Escherichia coli*, which found in human intestine, causes enteric infections, neonatal meningitis, lower urinary tract infections, coleocystis, and septicaemia[3].

In this context, *Shorea robusta* and *Butea monosperma* as the test plants were selected from Ranchi district of Jharkhand in India. Phytochemical analysis was performed by the standard methods and antibacterial activities have been explored on Gram negative bacteria *Escherichia coli.*

MATERIALS AND METHODS

Preparation of plants extract

Plant organs as leaves, flowers, fruits and barks of *Shorea robusta* Gaertn and *Butea monosperma* were collected from the jungles of Ranchi district of Jharkhand. Organs were separately dried in the dark place and converted to fine powders by mixer-grinder and lastly by sieve. 5 gm fine powders were diluted in the 100 ml solvents and kept overnight. Solvents as ethanol, was used to collect the extracts of each of the samples. Then the supernatant was filtered by 0.22 µm sterile filters (Millipore, Bedford, Massachusetts, USA) and stored at 4 °C until further use.

Phytochemical analysis

The qualitative detection of Phytochemicals was tested by the standard methods [4,5,6,7]. The Phytochemical tests included alkaloids, flavonoids, glycosides, phenols, reducing sugar, tannins, terpenoids and steroids.

Analysis of antibacterial activities

Antimicrobial activity of different plant extracts was determined by agar well-diffusion method. 0.1 ml of freshly grown culture of test organism was aseptically introduced and spread

on surface of sterile Muller Hilton agar plates. Wells of 6 mm diameter was made in agar plate with the help of sterile cork-borer. Fifty micro-liters of different plant extracts and same volume of extraction solvent for negative control was filled in the wells with the help of micro pipette. Standard reference antibiotic tetracycline was used as positive controls for the test organism. Plates was left for some time at 4°C till the extract diffuses in the medium with the lid closed and incubated at 37°C for 24 hr. The plates were observed for zone of inhibition. Antibacterial activity was evaluated by measuring the diameter of the zone of inhibition against the tested bacterial pathogens. Each assay in this experiment was replicated three times [8][9].

RESULTS AND DISCUSSION

Phytochemical analysis of each ethanolic extracts of *Butea monosperma* and *Shorea robusta* were executed. Results of phytochemical analysis have been mentioned in the Table 1. Alkaloids were negatively executed in all the four plants organs ethanolic extracts. Flavonoids, glycosides, phenols, steroids, tannins, terpenoids and reducing sugar were detected in ethanolic extracts of barks, leaves and flowers. In ethanolic extracts of fruits, flavonoids, glycosides, steroids, terpenoids were positively expressed, while phenols, tannins and reducing sugar were absent.

Table 1. Phytochemical analysis of different plant organs of *Butea monosperma*. (BA- Barks, LE- Leaves, FL- Flowers, FR- Fruits)

Phytochemical constituents	BA	LE	FL	FR
Alkaloids	-	-	-	-
Flavonoids	+	+	+	+
Glycosides	+	+	+	+
Phenols	+	+	+	-
Steroids	+	+	+	+
Tannins	+	+	+	-
Terpenoids	+	+	+	+
Reducing sugar	+	+	+	-

Analysis of phytochemicals in *Shorea robusta* of four different plants organs varying minorly only in the fruits extracts. Alkaloids in all the four plants organs of *Shorea robusta* was negatively expressed in ethanolic extracts. Flavonoids, glycosides, phenols, steroids, tannins,

terpenoids and reducing sugar were detected in ethanolic extracts of barks, leaves and flowers. In ethanolic extracts of fruits, flavonoids, glycosides, steroids, terpenoids, phenols and tannins were positively expressed, while reducing sugar was absent. Results of phytochemical analysis have been mentioned in the Table 2.

Table 2. Phytochemical analysis of different plant organs of *Shorea robusta*. (BA- Barks, LE- Leaves, FL- Flowers, FR- Fruits)

Phytochemical constituents	BA	LE	FL	FR
Alkaloids	-	-	-	-
Flavonoids	+	+	+	+
Glycosides	+	+	+	+
Phenols	+	+	+	+
Steroids	+	+	+	+
Tannins	+	+	+	+
Terpenoids	+	+	+	+
Reducing sugar	+	+	+	-

Ethanolic extracts of plants organs of *Shorea robusta* and *Butea monosperma*had been marked 1, 2, 3 and 4 for Barks(BA), Leaves(LE), Flowers(FL) and Fruits(FR) respectively, mentioned in the figures below. Ethanolic extracts of plant organs of *Butea monosperma*didn't exhibit zone of inhibition against Esherichia coli, which has been clearly visible in the Figure 1, at all the different concentration.

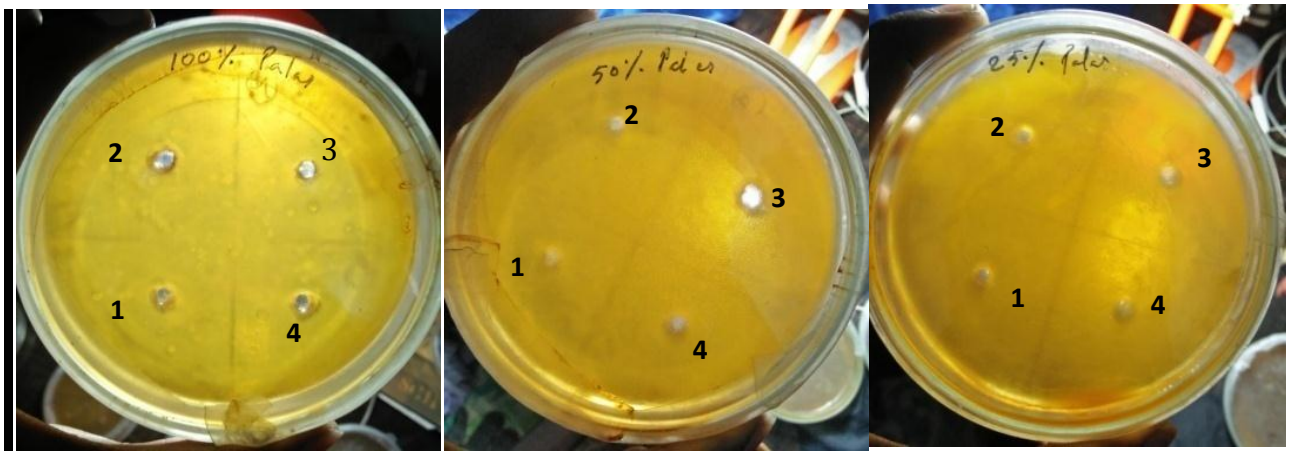

Figure 1. Antibacterial activities of ethanolic extracts of plant organs of *Butea monosperma*against *Escherichia coli*.

Ethanolic extracts of plant organs of *Shorea robusta* that is fruits, flowers and leaves did not express any zone of inhibitions against Escherichia coli. In Figure 2 it is very clear that well 2: Leaves, well 3: Flowers and Well 4: Fruits were failed to exhibit antibacterial activities against Escherichia coli, while well 1: containing ethanolic extracts of Barks of *Shorea robusta* in all the three different concentration, inhibited the bacterial growth shown in the Figure 2.

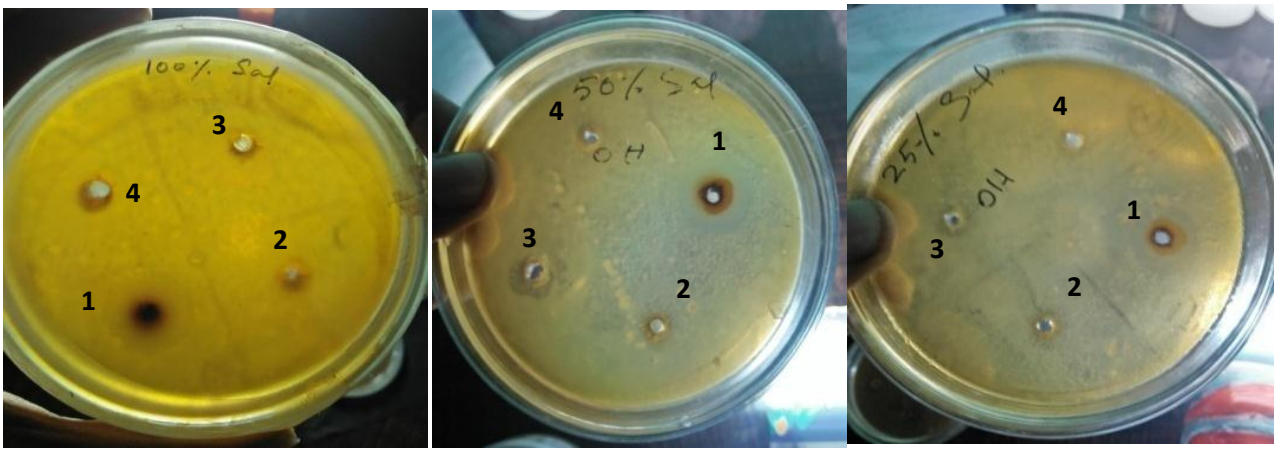

Figure 2. Antibacterial activities of ethanolic extracts of plant organs of *Shorea robusta* against Escherichia *coli*.

Ethanolic extracts of barks of *Shorea robusta* shows antibacterial activities against Escherichia coli which had been noticeable at different concentrations of extracts at 100%, 50% and 25% in a reducing pattern. The zone of inhibitions were visualized and measured in centimeter resulting 2.4.

Table 3. Zone of Inhibition in cm expressed by plant organs 1-BA-Bark, 2-LE-Leaves, 3-FL-Flowers and 4-FR-Fruits of *Shorea robusta*

Zone of inhibition (in cm)				
Concentration	**BA**	**LE**	**FL**	**FR**
100%	**2.4**	**-**	**-**	**-**
50%	**2.0**	**-**	**-**	**-**
25%	**1.6**	**-**	**-**	**-**

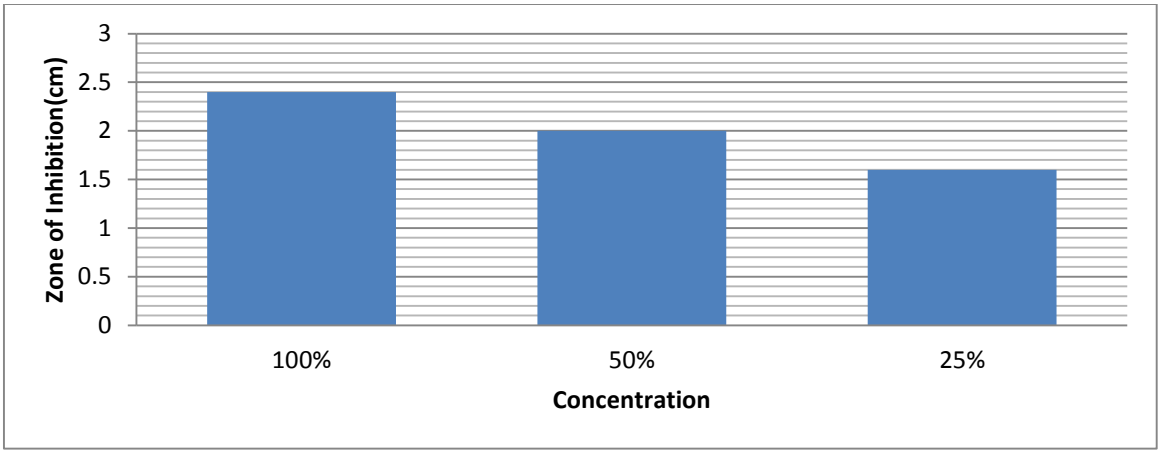

Figure 3. Graphical structure of zone of inhibition Vs Concentration expressed by ethanolic extract of Bark of *Shorea robusta*

cm, 2.0 cm and 1.6 cm, Figure 3 graphical status represents concentrations and influence of the ethanolic extract of Barks of Shorea robusta. The zone of inhibition expressed by control was 2.4 cm in diameter that was very similar to the test sample ethanolic extracts of Barks of Shorea robusta. This also reflects the effects of test samples that is, ethanolic extracts of plant organ bark of *Shorea robusta* as ethno medicine.

REFERENCES

1. Nair R, Vaghasiya Y, Chanda S, 2007. Antibacterial potency of selected Indian medicinal plants. International Journal of Green Pharmacy **1**: 37-44.
2. Nostro A, Germanò MP, D'angelo V, Marino A, Cannatelli MA, 2000. Extraction methods and bioautography for evaluation of medicinal plant antimicrobial activity. LettApplMicrobiol 30: 379-384.
3. Bannister B, Gillespie S, Jones J. Infection: Microbiology and Management. 3rd edn. Massachusetts, USA: Blackwell Publishing Ltd, 2006, 544.
4. Evans WC (2002). Trease and Evans Pharmacognosy, 15th edition. W.B Sauders Company Ltd, London. pp 137-139,230-240.
5. Siddiqui, A.A., Ali, M., 1997. Practical pharmaceutical chemistry, 1st edn, CBS Publishers and distributors, New Delhi. Pp. 126, 131- 7.
6. Iyengar MA (1995). Study of crude drugs. 8th ed., Manipal power press, Manipal, India pp 2.
7. Pandey V K, Mishra R., Chandra R., 2014. In vitro Culture of Moss BryumcoronatumSchwaegr. (Bryaceae) and It's Phytochemical Analysis. Int J Pharm Pharm Sci. 6(9), 307-311.
8. Jain, P., Bansal, D., Bhasin, P., 2009. Antibacterial activity of aqueous plant extracts against Escherichia coli and Bacillus subtilis. Drug Invent. Today, 2(4): 220 222.
9. Joshi, B., Sah, G.P., Basnet, B.B., Bhatt, M.,Sharma, D., Subedi, K., Pandey, J., Malla, R., 2011. Phytochemical extraction and antimicrobial properties of different medicinal plants: Ocimum sanctum (Tulsi), Eugenia caryophyllata (Clove), Achyranthes bidentata (Datiwan) and Azadirachta indica (Neem). J. Microbiol. Antimicrob., 3(1):1- 7.