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PHARMACOGNOSTIC, PHYTOCHEMICAL AND BIOLOGICAL STUDIES OF LEAVES OF *INDIGOFERA BARBERI*

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ABSTRACT

The antibacterial and antifungal activities of ethanolic extract of leaves of *Indigofera barberi* was evaluated by filter paper disc diffusion method. Antibacterial potential was tested against *Staphylococcus aureus*, *Bacillus subtilis* of gram positive; *Escherichia coli*, *Pseudomonas aeruginosa* of gram negative on nutrient agar medium and nutrient broth using Ceftriaxone as standard drug. For antifungal study, strains used were *Saccharomyces cerevisiae* and *Candida albicans* on Sabourauds dextrose agar and Sabourauds dextrose broth using Grieseofulvin as reference standard drug. The result showed that, the extract exhibit significant antibacterial activity against the selected strains except *Escherichia coli*. Also the extract shows the significant antifungal activity against the selected strains when compared with the standard drug. Pharmacognostical and phytochemical investigations were also performed on the leaves of *Indigofera barberi* Gamble.

KEYWORDS

Indigofera barberi, Antibacterial activity and Antifungal activity.

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INTRODUCTION¹⁻³

Indigofera barberi gamble is a class of dicotyledons plant belonging to the family Fabaceae. It is distributed in deciduous forests Talakona of Chittoor district. It is an erect plant under shrub. The leaves are about 20-26 mm long and 6-12 mm wide, oblong and ovate to lanceolate, base with a short petiole. The stem is thick, green to greygreen in colour. Flowers are red in axillary racemes stamens

diadelphous (9+1), pods are subterrate angular white pubescent, fruits are 6-7 seeded. Whole plant, part of plant is used for various ailments traditionally. It is widely used as most effective wound healing agent for curing wounds, cuts, burns and various skin diseases. It is also used as antidiabetic and antipyretic agent.

MATERIALS AND METHODS⁴⁻⁸

Plant material

The leaves of *Indigofera barberi gamble* were collected from the Kotappakonda hills, Narasaraopet, Guntur district, Andhra Pradesh, India. It was identified by local flora and voucher specimen was preserved in the Department of Pharmacognosy, A.M.Reddy Memorial College of Pharmacy, Narasaraopet, Guntur district, Andhra Pradesh, India.

Extraction

The leaves were dried under shade and made into coarse powder by hand operated mill. The powder was extracted by hot continuous extraction process using ethanol as solvent. The extract obtained was greenish brown in colour, soft in nature and shows 5.8% w/w of ethanol extractive value. The ethanolic extract was tested for the presence of phytochemical constituents and antimicrobial activities.

Powder microscopy

The powder microscopic characters of the leaves of *Indigofera barberi* was performed and it shows the presence of epidermis with stomata, trichomes, spongy parenchyma, calcium oxalate crystals, vessels and fibres.

Physical study

Coarse powder of leaves of *Indigofera barberi* was performed for foaming index, Swelling index, Loss on drying and total ash value. The foaming index

was found to be less than 100, the Swelling index was 1.2%, Loss on drying was 6%, total ash value was 1.6%.

RESULTS AND DISCUSSION

Phytochemical Screening

The alcoholic extract of *Indigofera barberi* was screened for its various phyto constituents by standard chemical tests. It was found to contain carbohydrates, glycosides, alkaloids, steroids and saponins. The results were summarised in Table No.1.

Anti-bacterial activity

In vitro antibacterial activity of ethanolic extract of leaves of *Indigofera barberi* was evaluated by filter paper disc diffusion method against four strains of microorganisms namely *S. aureus* (Figure No.1, 2 and 3) (MTCC 2079, Gm+ve), *B.subtilis* (Figure No.4, 5 and 6) (MTCC 2063, Gm+ve), *P. auregenosa* (Figure No.7, 8 and 9) (MTCC 2036, Gm-ve) and *E. coli* (Figure No.10 and 11) (MTCC 443, Gm-ve). Nutrient agar medium and nutrient broth was used to grow the test bacteria. Ceftriaxone was used as reference standard drug. The extract shows significant antibacterial activity against all the selected strains except *E.coli*. The results were summarized in Table No.2 and 3.

Anti-fungal activity

The ethanolic extract of *Indigofera barberi* was screened for its anti-fungal activity by filter paper disc diffusion method. The organisms used for anti-fungal activity were *S.cervisiae* (Figure No.12 and 13) and *C.albicans* (Figure No.14 and 15) using Griseofulvin as reference standard (Table No.4).

Table No.1: Phytochemical Screening of the alcoholic extract of *Indigofera barberi*

S.No	Plant constituents	Inference
1	Alkaloids	+
2	Volatile oils	—
3	Carboxylic acids	—
4	Fixed oils	—
5	Phenols	+
6	Quinines	—
7	Resins	—
8	Saponins	+
9	Tannins	—
10	Xantho-proteins	—
11	Glycosides	+
12	Coumarins	—
13	Carbohydrates	+
14	Emodins	—
15	Fatty acids	—
16	Terpenes	—
17	Cardinolides	—

(+): presence (-): absence

Table No.2: Zone of inhibitions (mm) of Standard and *I.barberi* extract against Gram +ve bacteria

S.No	Concentration (µg/ml)	<i>Staphylococcus aureus</i>		<i>Bacillus subtilis</i>	
		Standard	<i>I. barberi</i>	Standard	<i>I.barberi</i>
1	100	11 mm	10 mm	--	--
2	250	14 mm	14 mm	11 mm	9 mm
3	500	16 mm	15 mm	12 mm	12 mm
4	750	17 mm	17 mm	14 mm	14 mm
5	1000	18 mm	18 mm	16 mm	16 mm

Table No.3: Zone of inhibitions (mm) of Standard and *I.barberi* extract against Gram -ve bacteria

S.No	Concentration (µg/ml)	<i>E. coli</i>		<i>P. aeruginosa</i>	
		Standard	<i>I.barberi</i>	Standard	<i>I.barberi</i>
1	100	8 mm	--	6 mm	--
2	250	11 mm	--	7 mm	6 mm
3	500	14 mm	--	9 mm	8 mm
4	750	16 mm	--	12 mm	12 mm
5	1000	18 mm	--	14 mm	14 mm

Table No.4: Zone of inhibition of Standard and *I.barberi* extract against Fungi

S.No	Concentration (µg/ml)	<i>S. cerevisiae</i>		<i>C. albicans</i>	
		Standard	<i>I.barberi</i>	Standard	<i>I.barberi</i>
1	100	12 mm	9 mm	7 mm	--
2	250	15 mm	14 mm	9 mm	8 mm
3	500	16 mm	14 mm	10 mm	9 mm
4	750	18 mm	16 mm	12 mm	11 mm
5	1000	20 mm	18 mm	14 mm	13 mm

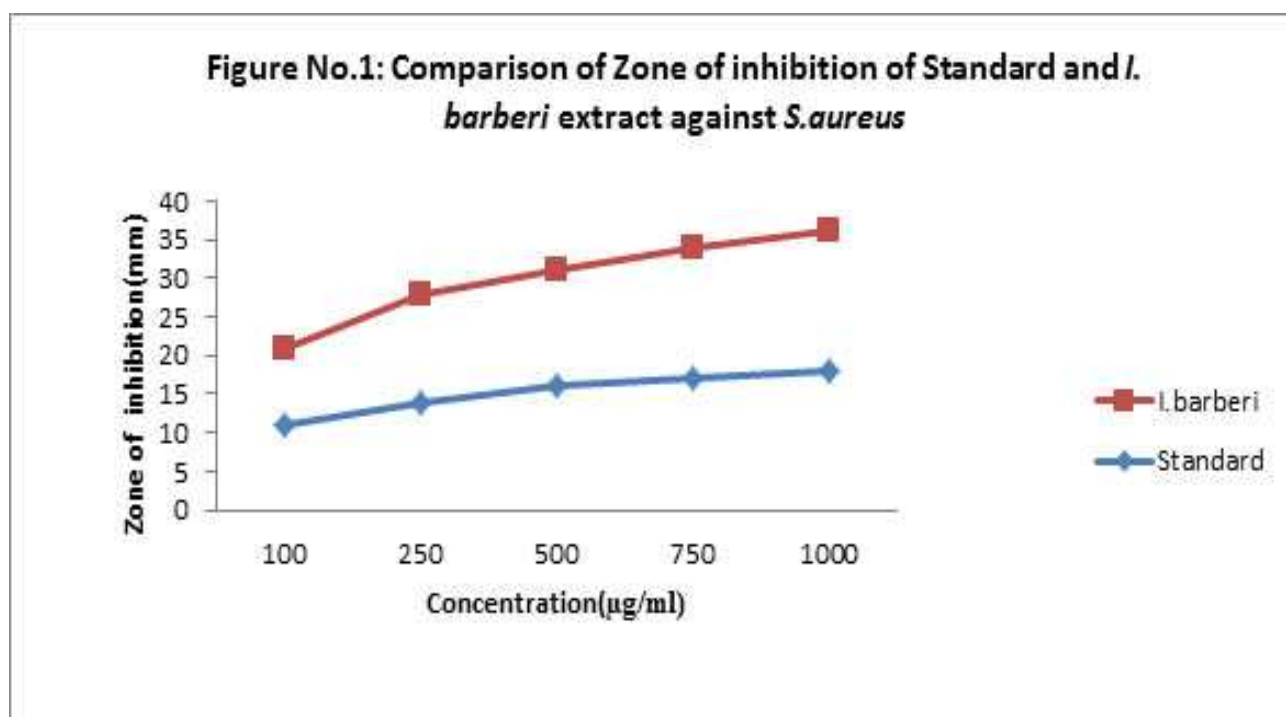


Figure No.1: Comparison of Zone of inhibition of Standard and *I. barberi* extract against *S.aureus*



Figure No.2: Standard- *S.aureus*



Figure No.3: *I.barberi*- *S.aureus*

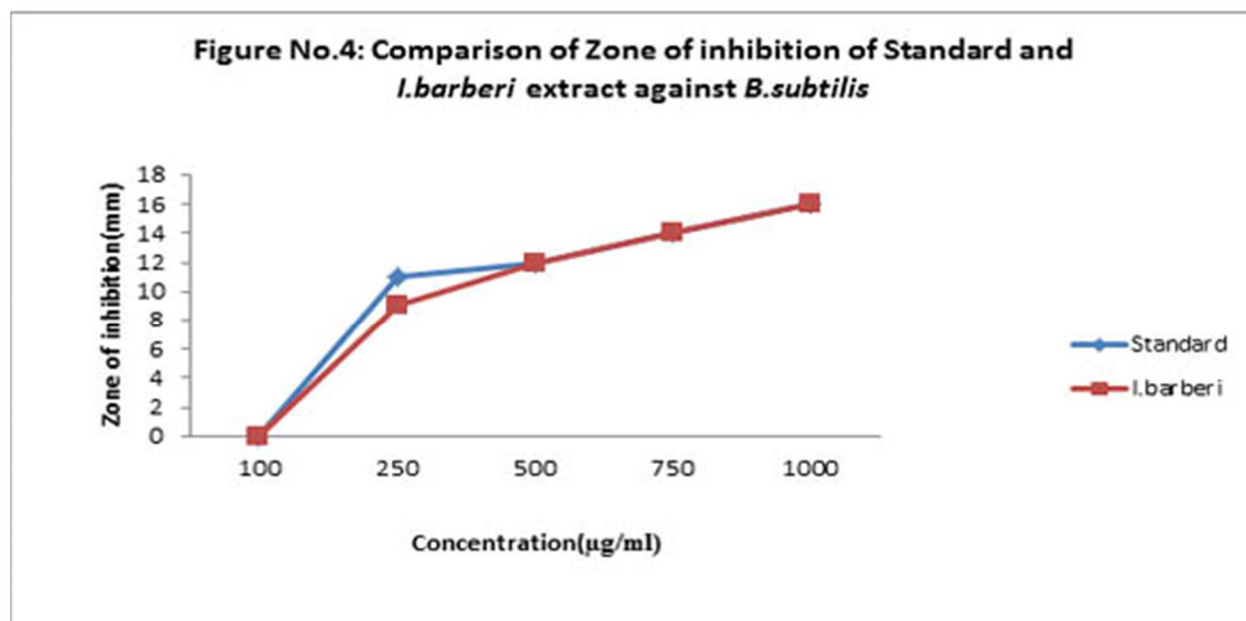


Figure No.4: Comparison of Zone of inhibition of Standard and *I.barberi* extract against *B.subtilis*

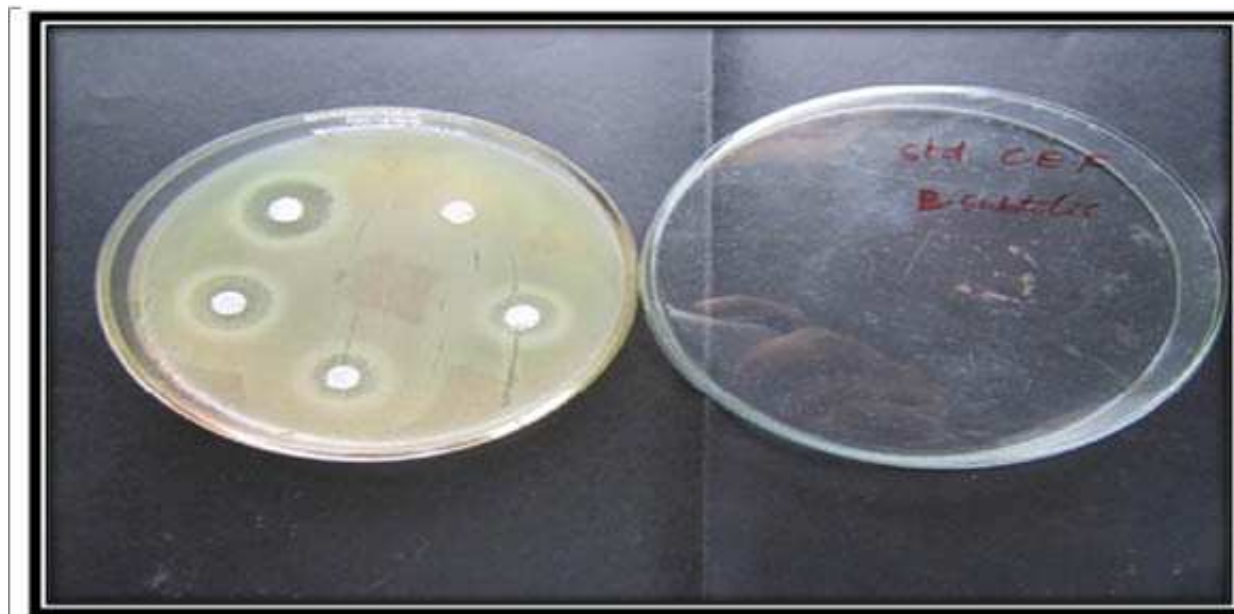


Figure No.5: Standard- *Bacillus subtilis*



Figure No.6: *I.barberi*- *Bacillus subtilis*

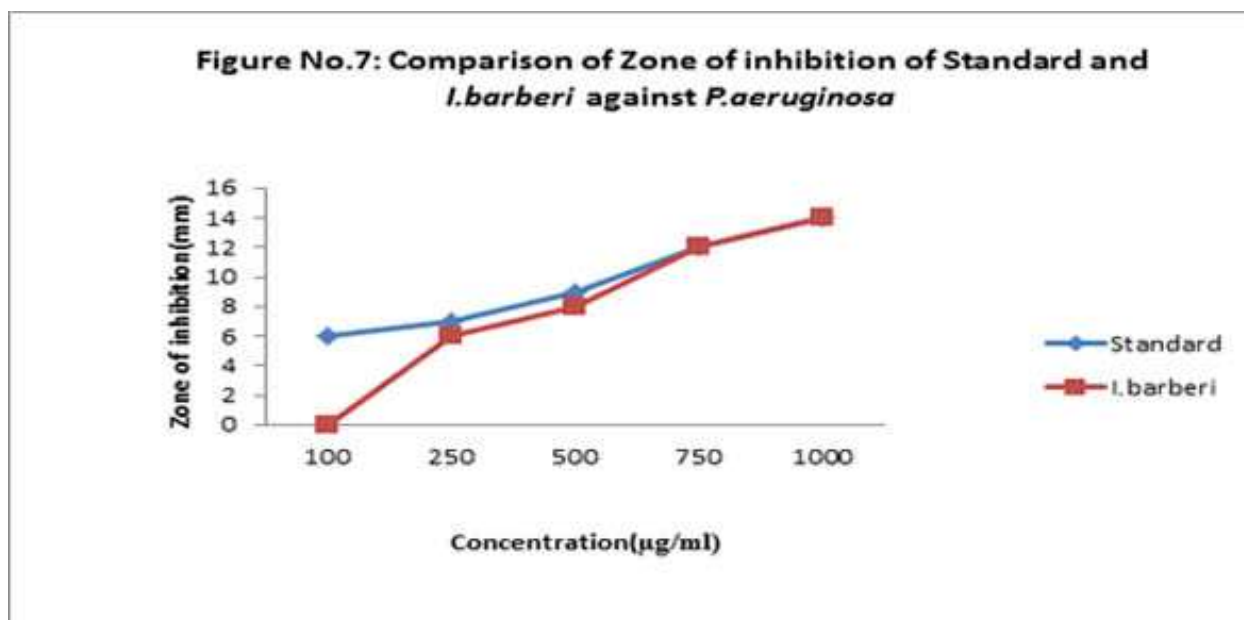


Figure No.7: Comparison of Zone of inhibition of Standard and *I.barberi* against *P.aeruginosa*



Figure No.8: Standard- *Pseudomonas*

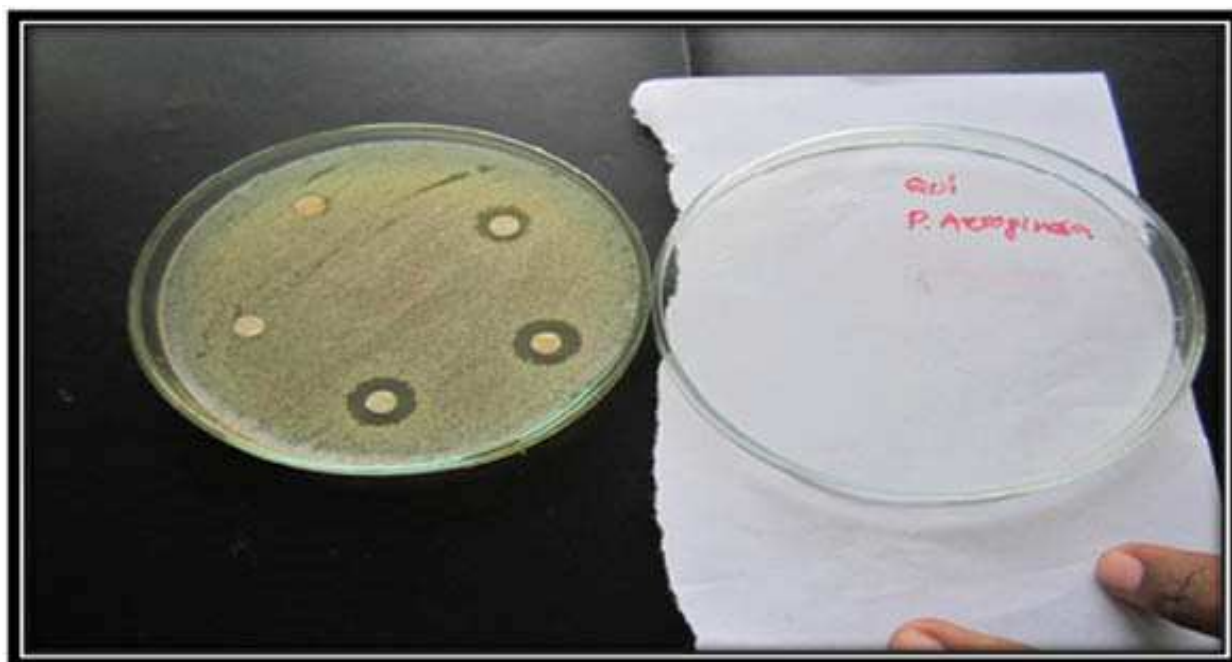


Figure No.9: *I.barberi Pseudomonas*

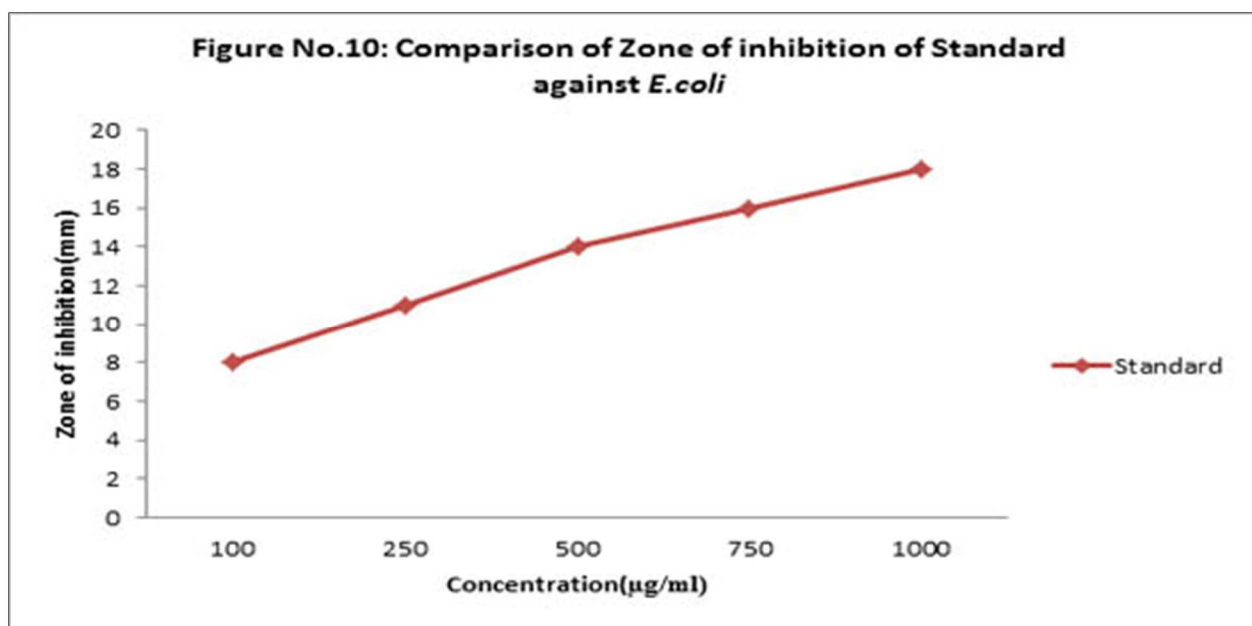


Figure No.10: Comparison of Zone of inhibition of Standard against *E.coli*

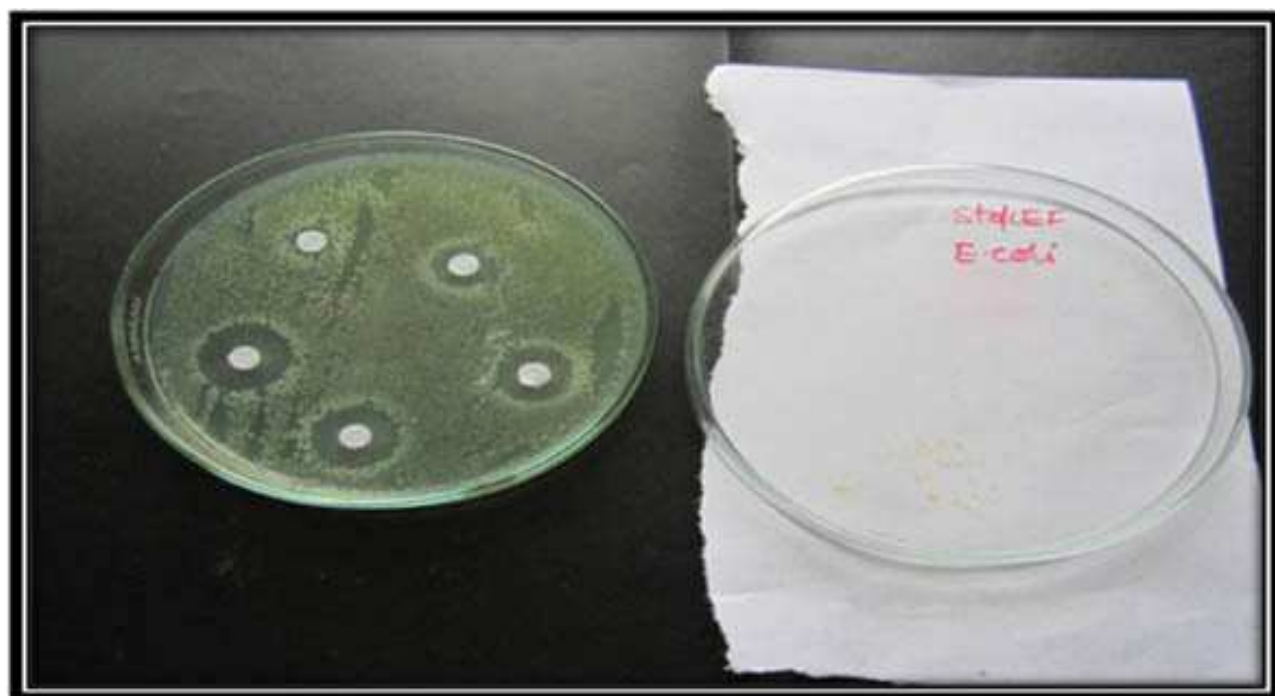


Figure No.11: Standard- *E.coli*

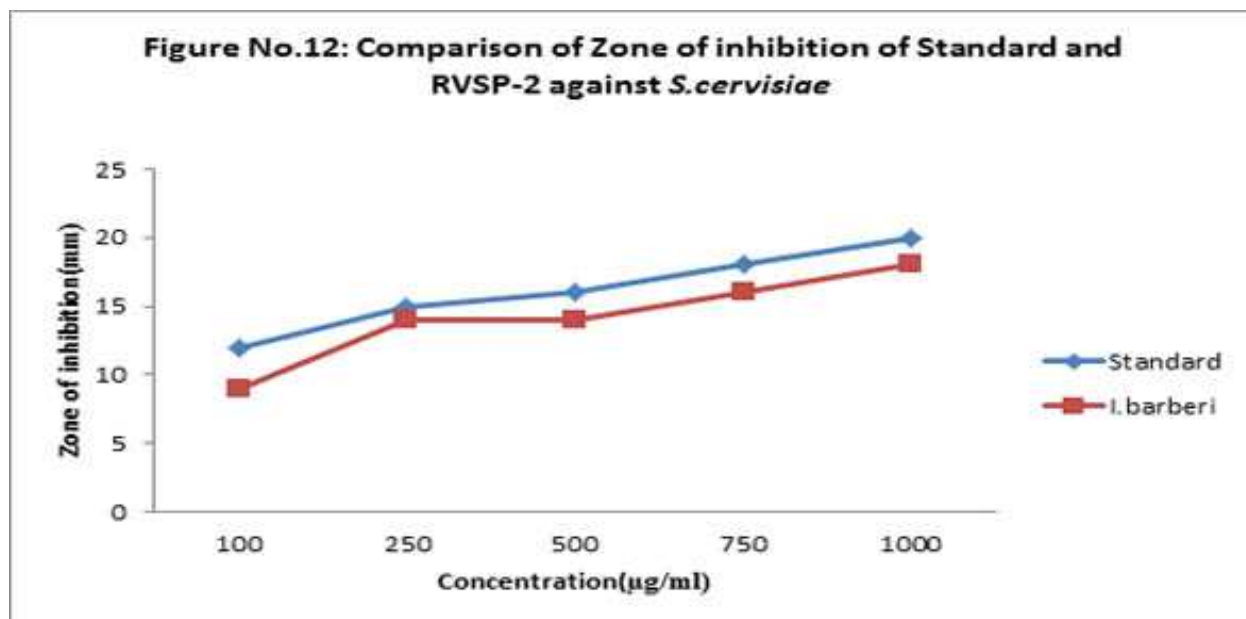


Figure No.12: Comparison of Zone of inhibition of Standard and RVSP-2 against *S.cervisiae*

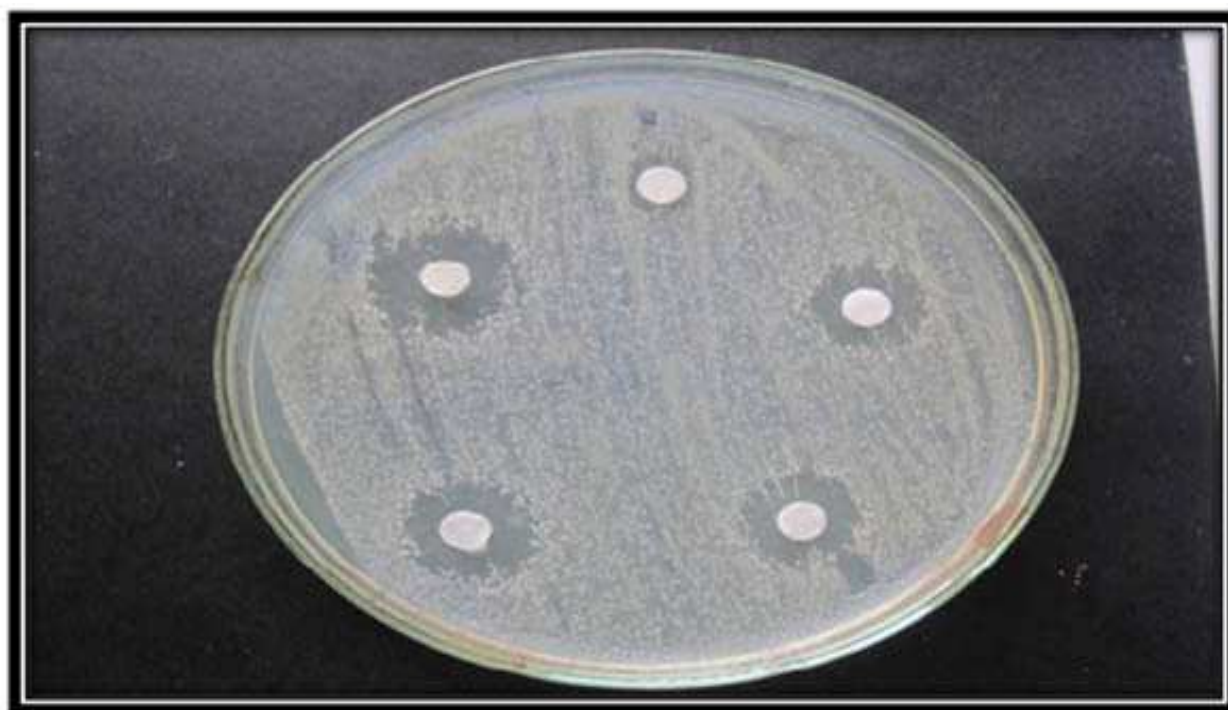


Figure No.13: *I.barberi*- *Saccharomyces cerevisiae*

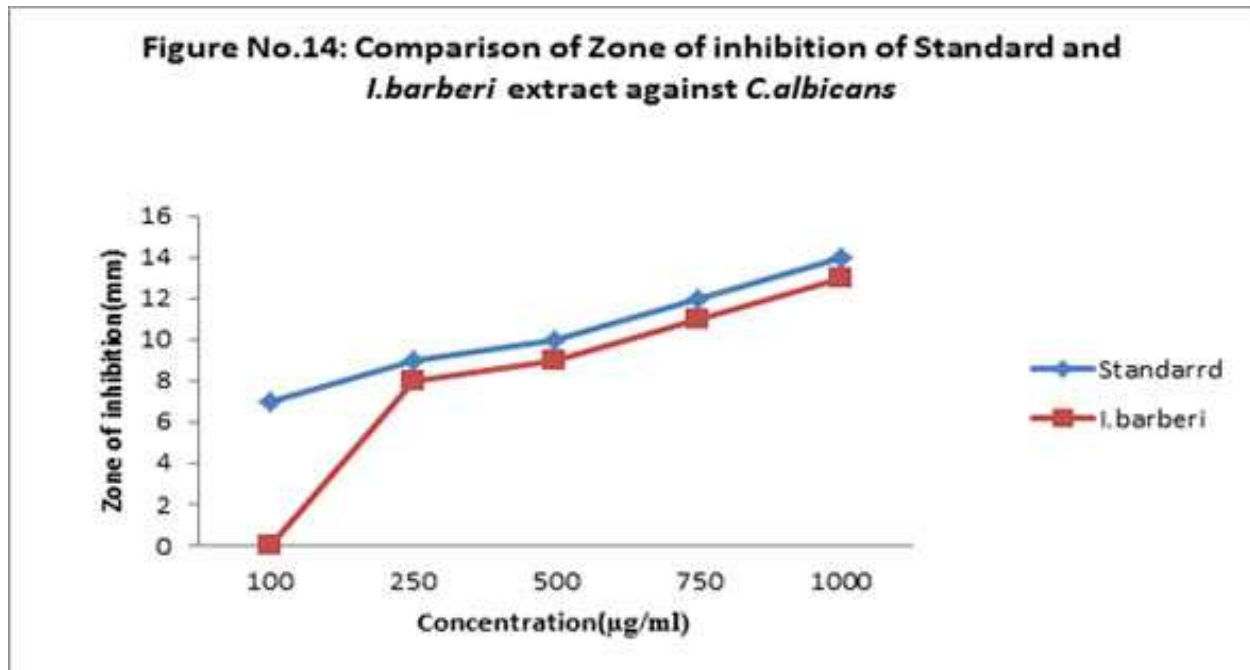


Figure No.14: Comparison of Zone of inhibition of Standard and *I.barberi* extract against *C.albicans*



Figure No.15: *I.barberi*- *Candida albicans*

CONCLUSION

According to the literature review, traditionally, the leaf part of *Indigofera barberi gamble* was used for various skin infections. So we thought of proving the activity by the scientific approach. As per the traditional belief, we have collected the leaves, identified by local flora, dried under shade, powdered and extracted by using ethanol. The ethanolic extract of leaves of *Indigofera barberi* was screened for its anti-bacterial activity against both Gram⁺ve and Gram⁻ve bacteria using Ceftriaxone as reference standard. Also the anti-fungal activity was screened against fungal strains using Griseofulvin as reference standard. The ethanolic extract of leaves of *Indigofera barberi* showed significant anti-bacterial and anti-fungal activity against the selected strains. Hence the project work carried out by us under the scientific manner proved its traditional claim.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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