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ANTIMICROBIAL ACTIVITY OF LEAF EXTRACT OF *PSORALEA CORYLIFOLIA* L.

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ABSTRACT:

Antimicrobial activity of leaf extract of *Psoralea corylifolia* L. was studied using different solvent like chloroform, acetone, ethanol and water against bacterial strains like *Bacillus subtilis, Staphylococcus aureus, Pseudomonus aeruginosa, Escherichia.coli* and fungal strains *Aspergillus niger* and *Penicillum chrysogenum*. The antimicrobial activity was determined by disc diffusion method. Out of the four extract used, chloroform acetone and ethanol extracts were found to be highly active against *Staphylococcus aureus, Bacillus subtilis ,Escherichia.coli and Aspergillus niger.*

KEY WORD: *Psoralea corylifolia, Bacillus subtilis*, *Staphylococcus aureus, Pseudomonus aeruginosa* , *Aspergillus niger*

INTRODUCTION:

The beginning of human civilization, medicinal plants have been used by mankind for its therapeutic value. Medicinal plants represent a rich source of antimicrobial agents and plant origin herbal medicines represent one of the most important fields of traditional medicine all over the world. In the present time, drug resistance in microbes is a very serious problem and hence, herbal medicines are symbolizing safety in contrast to the synthetics that are regarded as unsafe to human and environment. There are varied methods of medicines like Aurveda, Homeopathy and Unani, which utilize plant materials for many potent and powerful drug productions. Presently, Aurveda considered as a vital system of medicine and governed the worldwide recognition and having non-toxic substances. A wide range of medicinal plant parts is used for extract as raw drugs and they possess varied medicinal properties.

Psoralea corylifolia L., of the family Fabaceae, a much branched annual herb, it is a native to India and Iraq. It is found as a weed in waste places in Madhya Pradesh, Chattisgarh, Uttar Pradesh, Uttaranchal, Rajasthan, Gujarat and Andhra Pradesh. Traditional practitioners use this plant as a laxative, aphrodisiac, anthelmintic, diuretic and diaphoretic (Yoganarasimhan, 1996). As medicinal plants are gaining more

importance in Pharmaceutical industries for the preparation of new phytomedicines, this study was undertaken to check its properties as a drug.

MATERIALS AND METHODS:

Plant Material: *Psoralea corylifolia* L., an erect annual herb grows up to 30-180cm in height. Stem and branches grooved, studded with conspicuous glands and with a few appressed and spreading white hairs. Leaves simple, broadly elliptic, inciso-dentate, rounded and mucronate at the apex, sparingly clothed with white hairs on both surfaces, base cunneate, rarely rounded , main nerves 5, springing from the base, and 4-6 pairs of lateral nerves higher lip from the midrib, petioles 1cm long, hairy and gland-dotted , stipules lanceolate, persistent. Flowers close, in dense axillary solitary 10-30-flowered racemes, peduncles 1-2 in. long, hairy, pedicels very short. Calyx is long, hairy outside, the upper teeth linear lanceolate, the lower ovate, twice as long as the upper. Corolla is bluish purple, nearly twice as long as the calyx, standard orbicular, clawed, and glabrous. Pods are long, ovoid-oblong, somewhat compressed, closely pitted, mucronate, black, and glabrous. Seed smooth, one and adhering to the pericarp.

Extraction Procedure: The leaves of *Psoralea corylifolia* L., were collected from Dandeli of Uttara Kannada district, Karnataka. The leaves were dried under shade and made in to coarse powder using an electrical grinder. The powder was subjected for successive extraction with chloroform, acetone, ethanol and water using Soxhlet apparatus separately. The extracts were dried and dissolved in DMF (Dimethyl formamide) solution and screened for antimicrobial activity.

Preliminary Phytochemical Screening: The compounds that are responsible for therapeutic effect are usually the secondary metabolites. The preliminary phytochemical analysis (Kokate 1993) was carried out by following procedures:

Test for Alkaloids

A small portion of the extract is stirred with few drops of 1% Hydrochloric acid and filtered. The filtrate is treated with Wagner's reagent. Reddish brown precipitate indicates the presence of alkaloids.

Test for Saponins

One ml of extract is diluted with 20ml of distilled water and shaken vigorously for 15 min formation of stable foam indicates the presence of saponin

Test for Tannins

Development of blue green color in the extrac6t when treated with ferric chloride indicates the presence of tannins.

Test for Phenols

Phenol test Small quantity of extract is diluted with 5% ferric chloride solution. Development of intense color indicates the presence of phenols.

Test for Steroids and Triterpenes

Leibermann- Burchards test- The extract is treated with 50% sulphuric acid and a few drops of acetic anhydride is added . The development of reddish brown ring indicates the presence of steroids.

Salkowskis test- A few drops of chloroform and few drops of concentrated sulphuric acid was added to the extract. Appearance of yellow color in the lower portion indicates the presence of triterpenes

Test for Flavonoids

Ferric chloride test- The extract is treated with few drops of 5% ferric chloride. The appearance of blackish green color indicates the presence of flavonoids.

Antimicrobial assay:

The antimicrobial screening was done by using bacterial strains like *Bacillus subtilis, Staphylococcus aureus, Pseudomonus aeruginosa, Escherichia.coli* and fungal strains, *Aspergillus niger* and *Penicillum chrysogenum*. All the bacterial strains and fungal strains were obtained from the P.G.Department of Botany (Microbiology laboratory), Karnatak University Dharwad.

The antimicrobial activity was determined by disc diffusion method (Bauer *et al* 1966). Three different concentrations of 25mg/ml, 50mg/ml and 100mg/ml respectively were prepared. Each sterile disc was loaded with 10µl of test extract and placed on the agar plates inoculated with respective microorganisms. The plates were kept for half an hour for pre incubation diffusion. Then the plates were kept for incubation at 37°C for 24 hrs for bacteria and 48 hrs for fungi. At the end of incubation zones around the discs were measured in mm using Hi Antibiotic Zone scale. The study was performed in triplicate. Streptomycin disc was used as standard for bacteria and Nystain disc for fungi.

RESUTLS :

Table 1 contains the phytochemical analysis of the leaf extract of *Psoralea corylifolia* which shows the presence of alkaloids phenolic and flavonoid compounds. Table 2 gives the antimicrobial activity of *Psoralea corylifolia* leaf extract and the zone of inhibition in comparison with the standard used. Chloroform acetone and ethanol extracts were showed high activity against *Staphylococcus aureus, Bacillus subtilis, Escherichia.coli , Aspergillus niger* and these four strains found to be most sensitive to the leaf extract of *Psoralea corylifolia.* Among the different extracts tested, chloroform extract in its higher concentrations, is more active against *Staphylococcus aureus, Bacillus subtilis, Escherichia coli* and *Aspergillus niger*. The highest zone of inhibition in case of chloroform extract against *Staphylococcus aureus* is of 15 mm which is very much nearer to the standard zone of inhibition (18mm), *Bacillus subtilis* is 14 mm and against *Escherichia coli* the zone of inhibition is14 mm. Acetone extract also showed good inhibitory activity against these strains and the zone of inhibition obtained were 13mm, 13mm and 14mm respectively. Similarly the acetone extract of *Ocimum gratissimum* leaf also inhibited the growth of these two strains (Hosamani *et al*, 2012). In ethanol extract *Staphylococcus aureus, Bacillus subtilis,*

Escherichia.coli strains show 14mm zone of inhibition respectively. The antimicrobial activity of the leaf extracts, however, is because of its essential oil content (Nakamura *et al*, 1999; Usha *et al*, 2010; Hosamani *et al*, 2011). The chemical composition of the essential oil has been given by many workers (Yoganarasimhan, 1996; Pandey and Chowdhury, 2001). Similarly, antifungal activity of found to be most sensitive for the fungal strain *Aspergillus niger* .The antimicrobial activity may be due to the presence of alkaloids, flavonoids and phenolic compounds present in the plant as secondary metabolites. The present study indicates that the phytochemicals of *Psoralea corylifolia* has significant inhibition for a gram positive microbes, *Staphylococcus aureus,* Bacillus *subtilis* and gram negative *Escherichia.coli* and also fungal strain *Aspergillus niger.*

CONCLUSION:

The good antimicrobial activity of the *Psoralea corylifolia* leaf extract against Staphylococcus *aureus, Bacillus subtilis, Escherichia.coli* and *Aspergillus niger* is an indication that the leaf extract is beneficial as a cure for skin diseases. The present study exhibited the antibacterial and antifungal effects of various leaf extracts of *Psoralea corylifolia* is an indication of that the leaf extract is beneficial in the treatment of these microorganisms. The inhibitory effect of the extract justified the medicinal use of *Psoralea corylifolia* and strengthens the proof to its usage in the traditional treatment for different ailments.

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Table 1: Phytoconstituents of *Psoralea corylifolia* leaf extract

	Successive extracts			
Phytoconstituents	Chloroform	Acetone	Ethanol	Water
Alkaloids	+	+	+	+
Saponins	-	-	-	-
Tannins	-	-	-	-
Phenolic compounds	-	+	+	+
Steroids/Triterpenes	-	-	-	-
Flavonoids	+	+	+	+

Table 2: Zone of inhibition of different extracts of *Psoralea corylifolia* against different pathogens

Test Organisms	Standard Zone	Zone of Inhibition in mm											
		Chloroform			Acetone			Ethanol			Water		
		25	50	100	25	50	100	25	50	100	25	50	100
Bacteria Staphylococcus aureus	18	10	12	15	11	12	13	11	13	14	-	-	02
Bacillus subtilis	22	-	-	14	-	-	13	-	-	14	-	-	-
Pseudomonus aeruginosa	15	-	-	-	-	-	-	-	-	-	-	-	-
Escherichia coli	20	-	-	14	10	13	14	10	12	14	-	-	02
Aspergillus niger	19	-	-	10	11	13	14	10	11	14	-	-	-
Penicillum chrysogenum	16	-	-	-	-	-	-	-	-	-	-	-	-