

LETTER TO THE EDITOR

PRELIMINARY STUDIES ON THE *IN VITRO* ANTIMICROBIAL
ACTIVITY OF *TEPHROSEA PURPUREA*

Sir,

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The aqueous extract of various parts of the plant *Tephrosea Purpurea* (Sarphanka) has been used in Ayurvedic and Unani medicine for a variety of infective conditions (3). The plant is indigenous to North Eastern Madhya Pradesh where decoction of the root is used by the locals for treating sore throat, upper respiratory infection and infections of the lower urinary tract and is claimed to be very effective. In the present study the *in vitro* antimicrobial activity of the water soluble fraction of the alcoholic extract of *T. Purpurea* has been evaluated, in view of the claims made about its effectiveness.

250 g of dried powdered root of *T. Purpurea* was extracted with 90% alcohol in a soxhlet apparatus for 4 hr. The extract was concentrated and the resin was precipitated by adding acidulated water and filtered (1). The filtrate was evaporated to dryness, weighed and redissolved in ion free distilled water to yield a solution containing 50 mg/ml of the extract. Filter paper discs containing 500 g of the extract were prepared as per standard procedure and the *in vitro* antimicrobial activity was studied by disc diffusion method (2).

Organisms were cultured from various samples collected from the patients visting G.M. Hospital, Rewa. They were isolated on the basis of staining and identified by colony characteristics, biochemical reactions and other specific tests. Antimicrobial activity was expressed in terms of zone of inhibition produced after overnight incubation and compared with standard drugs. The concentration (μ g) of the extract and various drugs used per disc was :— *T. Purpurea* extract (TPE) 500; streptomycin 100; kanamycin 100; gentamycin 200; erythromycin 10; tetracycline 25; nalidixic acid 30; and cotrimaxozole 2.

The relative antimicrobial activity of the water soluble fraction of *T. Purpurea* extract against gram positive and gram negative microorganisms is shown in Table I.

TABLE I : Comparative antimicrobial activity of water soluble fraction of *T. Purpurea* extract (TPE) against gram positive and gram negative microorganisms.
(S - Sensitive, R - resistant to TPE)

Organisms	S	R	Zone of inhibition in mm				
			TPE	Cotrimaxazole	Streptomycin	Erythromycin	Tetracycline
Concentration $\mu\text{g}/\text{disc}$			500	2	100	10	25
G+ive Organisms							
<i>D. pneumoniae</i> (10)	10	—	8-24	0-15	0-25	—	—
<i>S. aureus</i> (10)	8	2	7-15	0-15	0-30	—	—
<i>S. pyogenes</i> (5)	5	—	6-10	—	—	8-20	8-20
<i>S. viridans</i> (5)	3	2	8-12	0-10	—	0-9	—
G—ive Organisms							
<i>E. coli</i> (40)	32	8	7-24	0-20	0-25	—	0-20
<i>Kl. pneumoniae</i> (10)	10	—	8-24	0-20	—	—	—
<i>Kl. aeruginosa</i> (5)	5	—	8-12	0-15	—	10-12	—
<i>Ps. pyocyanae</i> (5)	3	2	6-8	0-8	7-12	—	—
<i>B. proteus</i> (4)	2	2	7-8	—	0-10	—	8-12

(Figures in parenthesis indicate total number of cultures studied)

It can be seen from the Table I, that all the isolated strains of *D. pneumoniae* and *S. pyogenes* were sensitive to TPE. A rough estimate of relative potencies was made from the zone of inhibition and the following conclusions emerge which apply only to 'doses' of TPE and reference drugs in the discs. The fraction was as active as streptomycin against *D. pneumoniae* but was less effective than erythromycin and tetracycline against *S. pyogenes*. 80% of *S. aureus* and 60% of *S. viridans* cultured were sensitive to TPE, the activity being comparable to that of cotrimaxazole. Amongst the gram negative bacilli cultured, *Kl. pneumoniae* and *Kl. aeruginosa* were uniformly sensitive to TPE, while 80% of *E. coli*, 60% of *Ps. pyocyanae* and 50% of *B. proteus* were inhibited by the fraction. Antimicrobial activity of TPE was comparable to that of cotrimaxazole against *Klebsiella* microorganisms and to kanamycin against the remaining organisms.

S. viridans resistant to TPE was sensitive to cotrimaxazole and erythromycin but *S. aureus* resistant to TPE was found to be resistant to all other antibiotics tested. *E. coli*

resistant to TPE was sensitive to kanamycin, cotrimoxazole and nalidixic acid, while the growth of resistant *B. proteus* was inhibited by nalidixic acid only.

In summary, the effect of TPE was comparable to that of cotrimoxazole against *S. aureus*, *S. viridans*, *Kl. pneumoniae* and *Kl. aeruginosa*, to streptomycin against *D. pneumoniae* and to kanamycin against *E. coli*, *Ps. pyocyanae* and *B. proteus*. Its activity against *S. pyogenes* was less than that of erythromycin and tetracycline.

The plant contains Tephrosin, Degulin, Rotenone and Galegin as active principles and their use as insecticide and fish poison has been reported in literature (4). Takatsuki *et al.* have reported antiviral activity of Rotenone, Degulin and related compounds against animal and plant viruses (5). However, Rotenone and Degulin are soluble in organic solvents but insoluble in water, while Galegin is freely soluble in organic solvents and water (4). In view of these solubility characteristics of the active principles present in the plant, the observed antimicrobial activity of the fraction appears to be due to galegin present in it. Preliminary chromatographic and chemical studies confirmed the presence of galegin in the fraction, though, presence of and action of other active ingredients is not excluded at present.

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