LETTER TO THE EDITOR

PRELIMINARY STUDIES ON THE IN VITRO ANTIMICROBIAL ACTIVITY OF TEPHROSEA PURPUREA

Sir,

( Received on July 8, 1987 )

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 μg 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 visiting 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 (μg) of the extract and various drugs used per disc was:— T. Purpurea extract (TPb) 500; streptomycin 100; kanamycin 100; gentamycin 200; erythromycin 10; tertracycline 25; nalidixic acid 30; and cotrimaxazole 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)

<table>
<thead>
<tr>
<th>Organisms</th>
<th>S</th>
<th>R</th>
<th>Zone of inhibition in mm</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>TPE</td>
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<td></td>
<td></td>
<td></td>
<td>Concentration μg/disc</td>
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<tr>
<td>D. pneumoniae (10)</td>
<td>10</td>
<td>-</td>
<td>8-24</td>
</tr>
<tr>
<td>S. aureus (10)</td>
<td>8</td>
<td>2</td>
<td>7-15</td>
</tr>
<tr>
<td>S. pyogenes (5)</td>
<td>5</td>
<td>-</td>
<td>6-10</td>
</tr>
<tr>
<td>S. viridans (5)</td>
<td>3</td>
<td>2</td>
<td>8-12</td>
</tr>
</tbody>
</table>

(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 cotrimoxazole. 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 cotrimoxazole against Klebsiella microorganisms and to kanamycin against the remaining organisms.

S. viridans resistant to TPE was sensitive to cotrimoxazole 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, cotrimaxazole 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 cotrimaxazole 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 insectiside 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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D. C. AGARWAL, S. KHURANA, A. K. SHRIVASTAVA, K. K. SHRIVASTAVA* AND A. W. BHAGWAT

Department of Pharmacology and Department of Pathology*
S. S. Medical College, Rewa - 486 001 (M. P.)

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