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NOTE

In Vitro Antimicrobial Studies on the Saponin obtained from *Caesalpinia Sappan* Linn.

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In the present work, the antimicrobial activity of the saponin obtained from *Caesalpinia Sappan* Linn. has been discussed.

Caesalpinia sappan[1,2] (N.O. Leguminosae), commonly known as Bakam in Hindi, is a native of South India and Bengal and has been described by Ayurvedic system of medicine to possess potential therapeutic value in rheumatic conditions. The Ayurvedic system of medicine describes the wood of the plant to be bitter, dry, sour and cooling. The wood has been found to be effective in strangury, urinary concretions and blood complaints. The wood has also been found to stop bleeding from the chest and lungs. The decoction of the wood has been found to be very useful in dysentery and diarrhoea. The study of carbohydrates, protein and amino acids, triterpene alcohols and fixed oil of this plant have been reported earlier[3-6]. The present communication reports the antimicrobial activity of the saponin obtained from its heartwood.

The finely powdered and air dried defatted heartwood of *Caesalpinia sappan* (500 gm.) was extracted with ethanol (80%) in a soxhlet extracter for several days. The ethanolic extract (500 ml.) was concentrated under reduced pressure to yield brown tarry mass (100 ml.). The tarry mass was dissolved in methanol and filtered. To the filtrate was added large amount of acetone to get precipitate. The process of dissolution in methanol and precipitation by acetone was repeated to get crude saponin in an yield of 2.5%. The crude saponin was found to be a triterpenoid giving one spot in TLC. The crude saponin was purified by column chromatography on silica gel. The purity of the saponin was further confirmed by paper chromatography and TLC. The crude saponin has been tested for its antimicrobial activity on the following organisms.

BACTERIA

1. *Escherichia coli*
2. *Bacillus subtilis*
3. *B. anthraces*
4. *Proteus vulgaris*
5. *Salmonella richmond*
6. *Salmonella stanley*
7. *Salmonella newport*
8. *Pseudomonas aeruginosa*
9. *Staphylococcus quereus*
10. *Streptococcus agalactiae*

FUNGI

1. *Aspergillus niger*
2. *Aspergillus fumigatus*
3. *Aspergillus flavus*
4. *Penicillium digitatum*
5. *Fusarium oxysporum*

For the study of antimicrobial activity, the "oxide nutrient broth" was used to inoculate and the agar media was prepared by the addition of 2 % agar to the oxide nutrient broth. For determining the antifungal activity "Saboraud's broth" was used to inoculate and the media prepared by adding 2% agar to the Saboraud's broth.

Paper disc diffusion plate method[7] was adopted to study the antimicrobial activity. The discs of 6 mm. in diameter were prepared from special microbiological disc. The saponin which is very hygroscopic in nature was taken and the paper discs, dipped in the solution of saponin were placed over the seeded medium and incubated for 40 hours and 74 hours in the case of Bacteria and Fungi respectively. The experiments were performed in triplicate and the average zones of inhibition have been recorded.

The saponin has been found to be highly active in inhibiting the growth of *Bacillus subtilis* (zones of inhibition 24 mm) and moderately active against *Salmonella newport* (16 mm), *Aspergillus niger* (15 mm), *Salmonella stanley* (15 mm), *Proteus vulgaris* (14 mm), *Aspergillus flavus* (14 mm).

It has shown less activity against *Bacillus anthraces* (12 mm), *Salmonella richmond* (11 mm), and *Pencillium digitatum* (10 mm) and no activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus quereus*, *Streptococcus agalaetiae*, *Aspergillus fumigatus* and *Fusarium oxysporum*.

These results confirm that the triterpenoidal saponin is having antimicrobial activity.

REFERENCES

1. R. N. Chopra, S. L. Nayar and I. C. Chopra "Glossary of Indian Medicinal Plants", Supplement C.S.I.R. Publication, New Delhi, p. 12 (1956).
2. K. R. Kirtikar and B. D. Basu "Indian Medicinal Plants", **2**, 847 (1935).
3. S. S. Nigam, V. K. Saxena and R. N. Yadava, *Indian J. Pharm.*, **39**, 85 (1977).
4. ———, *The Journal of Research in Indian Medicine, Yoga and Homoeopathy*, (B.H.U., Varanasi), **13**, 82 (1978).
5. ———, *J. Inst. Chemists (India)*, **50**, 65 (1978).
6. R. N. Yadava, S. S. Nigam, *Acta Cienc. India*, **13C**, 87 (1987).
7. J. C. Maruzzella and P. A. Henry, *J. Amer. Pharm. Assoc.*, **47**, 471 (1958).

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