# Antimicrobial activity of *Cassia alata*

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**The in vitro antimicrobial activity of *Cassia alata* leaf extracts has been investigated against *S. aureus, S. aureus coagulase positive, B. subtilis, B. cereus, B. stearothermophillus, E. coli, V. cholerae, S. typhi, S. dysenteriae* and *K. pneumoniae*. The acetone and ethanol (95%) extract of *Cassia alata* showed high activity against nearly all test microorganisms. The inhibitory effects of extracts are very close and identical in magnitude and are comparable with that of standard antibiotics used.**

*CASSIA alata* Linn. (Leguminosae) is a shrub employed in traditional medicine in many parts of India and the West Indies for treatment of various skin diseases such as eczema, pruritis and itching[1]. Fresh leaves are also given internally in case of snake bite[2] and recorded to posses antitumour[3], insecticidal[4] and antifungal properties[5]. The present study was undertaken to evaluate antimicrobial activity of *Cassia alata* extracts.

The *Cassia alata* leaves were procurred from the Government Nursery, Nagpur during July-August 1992. The material was botanically identified and confirmed from the Department of Botany, Nagpur University, Nagpur. The leaves were dried under shade and powdered. The powdered leaves were exhaustively extracted with chloroform, acetone and ethanol (95%) using a Soxhelt extractor. The extracts were concentrated to dryness *in vacuo*.

The ethanol (95%) extract was dissolved in sterile water while other organic solvent extracts were dissolved in sterile water with the help of sterile Tween 80 (0.5 mL), which was previously tested for antimicrobial activity against all test microorganisms and found negative. These solutions were further diluted to get test solutions of required concentrations. Solution were further diluted to get test solutions of required concentrations. Solution of desired concentrations of ampicillin and tetracycline were prepared and used as standards.

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The antimicrobial activity of various organic solvent extracts was assayed by agar cup-plate method[6]. Ampicillin and tetracycline were used as standard and nutrient agar was employed as medium. The *in vitro* screening of antimicrobial activity was carried out against *S. aureus, S. aureus coagulase positive, B. subtilis, B. cereus, B. stearothermophillus, E. coli, V. cholerae, S.typhi, S. dysenteriae* and *K. pneumoniae*. The plates were inoculated with 18 h culture of respective microorganisms. The cups were made aseptically with cork borer having 6 mm diameter and 0.2 mL of test solutions of each extract as well as the standard was added into the cup using a dropping pipette under aseptic conditions. The plates were kept in a refrigerator for 2 h as a period of pre-incubation diffusion followed by incubation at 37±0.5°. the zone of inhibition of microbial growth was measured after incubation for 18h. Each experiment was carried out in three replicates and the mean diameter of inhibition zone recorded.

Results of screening of antimicrobial activity of Cassia alata extracts are summerised in Table 1. It is evident from the results that, the acetone and ethanol (95%) extract showed high antimicrobial activity against nearly all the test microorganisms. These extracts showed significant inhibition of the growth of *S. aureus, B. subtilis, B. cereus, B. stearothermophillus, E. coli, S. typhi* and *S. dysenteriae*. In addition to this, the acetone extract inhibited the growth of *V. cholerae* while ethanol (95%) extract inhibited growth of *K. pneumoniae*. Chloroform extract showed activity only against *B. subtilis* and *V. cholerae*. The degree of growth

Table-1 : Antimicrobial activity of *Cassia alata* extracts

| Organisms | Diameter of growth inhibition zone (mm) | | | | |
|---|---|---|---|---|---|
| | Extracts | | | Standards | |
| | Chloroform a | Acetone a | Ethanol (95%) a | Ampicillin b | Tetracycline c |
| *S. aureus* | - | 12 | 13 | 10 | 26 |
| *S. aureus coagulase positive* | - | - | - | 11 | 14 |
| *B. subtilis* | 13 | 14 | 13 | 13 | 20 |
| *B. cereus* | - | 12 | 13 | - | 26 |
| *B. stearothermophillus* | - | 13 | 15 | 08 | 19 |
| *E. coli* | - | 13 | 14 | 14 | 17 |
| *V. cholerae* | 12 | 12 | - | 16 | - |
| *S. typhi* | - | 14 | 13 | 13 | 11 |
| *S. dysenteriae* | - | 12 | 15 | 11 | 16 |
| *K. pneumoniae* | - | - | 14 | 12 | - |

All values are an average of 3 determinations

The concentrations of extracts employed were a. 20 mg/ml b. 10 µg/ml and c. 30 µg/ml Diameter of cups was 6 mm. Tween 80 alone showed no activity against any of the organisms

inhibition ranged from 12 mm to 15 mm against test microrganisms and was comparable with ampicillin and tetracycline, the standard antibiotics employed. The ethanol (95%) extract of *Cassia alata* leaves was found to have wider antimicrobial activity. From these results, it can be concluded that *Cassia alata* extracts can be regarded as a broad spectrum antimicrobial agent.

The detailed chemical nature of the active principle (s), responsible for antimicrobial activity is not known. However, the preliminary phytochemical screening has shown the presence of anthraquinones, sterols and flavonoids.

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## REFERENCE

1. Dymock W., "Pharmacographica India-A History of the Principal Drugs of Vegetable Origin", Vol. I, Educational Society's Press, Byculla, 1980, 518.
2. Kirtikar K.R. and Basu B. D., "Indian Medicinal Plants", 2nd Ed., Vol.II, Jayyed Press, Delhi, 1975, 780.
3. Belkin M., Fitzgerald B. D. and Cogan G. W., **J Natl. Cancer Inst.,** 1952, 13, 139.
4. Sieves A. F., Archer W. A., Moor R. H. and McGovran E. R., **J. Econ Entomol.** 1949, 42, 549.
5.. Palanichamy, S. and Nagarajan, S., **J. Ethnopharmacol.,** 1990, 29, 337.
6. Indian Pharmacopoeia; 3rd Ed., Vol.II, The controller of Publication, Delhi, 1985, 88.