



PHARMACOLOGY

ANTIBACTERIAL ACTIVITY OF *CASSIA TORA* LEAVES

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Abstract

Ethanollic and aqueous extracts from the leaves of *Cassia tora* were investigated for their antibacterial activity. Their concentrations 0.15mg, 0.31mg ethanolic and aqueous extracts respectively were studied in activity, which involved the determination of inhibition zone in mm. Both the extracts exhibited significant antibacterial activity. Ciprofloxacin used as standard reference. The antibacterial activity of ethanolic and aqueous extracts of *Cassia tora* has therefore been demonstrated for the first time.

Keywords: Antibacterial activity, *Cassia tora*, Ethanolic extract

Introduction

Cassia tora (Leguminosae) is a wild crop and grows in most parts of India as a weed. According to Ayurveda the leaves and seeds are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiotoxic and expectorant (Ahmed *et al.*, 1998). The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders (Chan and Peria, 2001). Chemical component of *Cassia tora* are anthraquinones, chrysophanol, emodin, obtusifolin, obtusin, chryso-obtusin, aurantio-obtusin, and their glycosides. Naphthopyrones, rubrofusarin, norrubrofusarin, rubrofusarin, entriobioside. Toralactone, torachryson. Roots contains 1, 3,5-trihydroxy-6-7-dimethoxy-2-methylanth- roquinone and beta-sitosterol. While Seeds contains naphtho-alpha-pyrone-toralactone, chrysophanol, physcion, emodin, rubrofusarin, chrysophonic acid-9-anthrone. Emodin, tricontan-1-ol, stigmasterol, beta-sitosterol-beta-D-glucoside, freindlen, palmitic, stearic, succinic and d-tartaric acids, uridine, quercitrin and isoquercitrin are isolated from leaves (Davis, 1994 and Desta, 1993). Antibacterial, anti-platelet aggregation, hepatoprotective, cAMP-phosphodiesterase inhibitory activity antifungal, antiyeast, anti-inflammatory and antiestrogenic, hypolipidemic, anti-mutagenic and antioxidant activities has been evaluated (Devi *et al.*, 1994, Duke and Beckstrom, 2002 and Karaman *et al.* 2003).

Literature survey revealed that the plant extract has yet not been screened for its traditional claim of antibacterial activity. Therefore the objective of this work was to explore the antibacterial properties of *Cassia tora* leaves.

Material and Methods

Plant collection

The pods of *Cassia tora* were collected from different localities of Parbhani district (M.S.), during month of June to August 2010.

Preparation of plant extracts

The pods were collected and dried under shed at room temperature and then powdered with a mechanical grinder and stored in air tight container. A Soxhlet apparatus was used for extractions of antimicrobial active compounds from the powder. 20gm of dried powder with thimble and then subjected to extraction with the methanol and aqueous solvents separately. The collected extract was concentrated by evaporation under room temperature. Then the extracts were used for antimicrobial activity assay.

Test microorganisms

The following gram positive and gram negative bacteria and fungi were used for antimicrobial activities studies. Bacteria include *Escheria coli* (ATCC25922), *Pseudomonas aeruginosa* (ATCC13048), *Staphylococcus aureus* (ATCC25923), *Bacillus subtilus* (ATCC11778), *Aspergillus niger* (ATCC12098), and *Candida albicans* (ATCC12045). The microorganisms were obtained from School of Life Science, S.R.T.M. University, Nanded, India.

Preparation of test organism's suspension

The test organisms were maintained on slants of medium containing nutrient agar [2.5gm/100ml] and sub cultured once a week. The slants incubated at 37°C for 24hrs. Then organisms were stored under refrigeration. The inoculum was 1x10⁸cells/ml (Chessbrogh, 2000). Leaves were dried at room temperature and 10gm powdered leaves were

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successively defatted with petroleum ether (40-60°C). Defatted residue was extracted with ethanol. Percentage yield of various extracts was found to be 3.00% (ethanol), 10.3% (aqueous extract). Both the extracts were evaluated for preliminary phytochemical screening. The extracts showed the presence of cardiac glycosides, flavonoids and saponins, alkaloids. Aqueous extract showed fats, carbohydrates, saponins, less quantity of cardiac glycosides, flavonoids (Mastroeni, 2002 and Robins and Hartland, 2002 and Villavicencio and Perez- Escandon, 1992).

Antimicrobial activity

Ethanollic and aqueous extracts from the leaves of *Cassia tora* were investigated for their antibacterial activity against *Pseudomonas aeruginosa*, *Lactobacillus*, *Salmonala typhi*, *P.vulgaris*, *Bacillus subtilis*, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *E. coli*, *Enterobacter* bacteria.

The filter paper disc method was performed using nutrient broth media (Somchit *et al.*, 2003, Van der 1972. These agar media were inoculated with 0.5 mL of the 24 h liquid cultures containing 10⁷ microorganisms / ml. Filter paper discs (3 mm

diameter) saturated with solutions of each compound (concentrations 100µg/ml in DMSO) was placed on the indicated agar mediums. The incubation time was 24 h at 37 ± 2°C. Standard discs of ciprofloxacin of 5µg/ml were used. Zone of inhibition was observed by zone reader scale. The tests were repeated to confirm the findings and the average of the readings was taken into consideration.

Result and Discussion

Preliminary phytochemical screening of alcoholic extract revealed the presence of anthraquinone glycosides, phenolic compounds; saponins glycoside and while aqueous extract showed presence of glycosides and phenolic compounds, saponins glycoside.

Ethanollic extract (0.15mg) and aqueous extract (0.31mg) of *Cassia tora* showed antibacterial activity against all tested bacteria but maximum activity were showed by aqueous extract against *Staphylococcus aureus*, *Lactobacillus*. But aqueous extract did not showed any activity against *Salmonella typhi*. (Table 1)

Table 1. Antimicrobial activity of *Cassia tora* leaf

Name of Bacteria	Zone of Inhibition (mm)		
	Ethanollic extract (0.15mg)	Aqueous extract (0.31mg)	Std (2mg)
<i>P. aeruginosa</i>	10.5	11	18
<i>Lactobacillus</i>	11	13	16
<i>S. typhi</i>	-	4	24
<i>P.vulgaris</i>	10	12	15
<i>B. subtilis</i>	8.5	10	20
<i>S. aureus</i>	11	15	22
<i>S. pneumonia</i>	7	8	14
<i>E. coli</i>	8	9	15
<i>Enterobacter</i>	9	11	16

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