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Antimicrobial activity of Saponins rich fraction of *Cassia auriculata* Linn against various microbial strains

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ABSTRACT

In the present investigation, the saponins rich fraction of roots of *Cassia auriculata* L. was evaluated for antimicrobial activity against *P. vesicularis*, *Streptococcus faecalis*, *Aeromonas hydrophilia*, *Salmonella typhae*, *Staphylococcus cohnii*, *Serratia ficaria* and *E. coli* at concentration of 12.5 mg/ml, 25 mg/ml, 37.5 mg/ml and 50 mg/ml. Antimicrobial activity of *Cassia auriculata* L. was carried out by well diffusion method. At maximum conc i.e. 50 mg/ml antimicrobial effect of Saponin rich extract can be arranged in sequence of - *P. vesicularis* > *Serratia ficaria* > *Streptococcus cohnii* > *Aeromonas hydrophilic*>, *Salmonella typhae* > *Sterptococcus faecalis* > *E. coli*. The results indicate the saponins rich fraction of roots of *Cassia auriculata* L. might be exploited as natural drug for the treatment of several infectious diseases caused by these organisms. *Cassia auriculata* L. was observed to have antibacterial activity and can be used for medicinal purposes.

Key Words: Infectious diseases, ayurveda, indian traditional medicines, caesalpiniaeeae, well diffusion method, pathogens.

INTRODUCTION

With the rising prevalence of microorganism showing resistance to antibiotics, there is an urgency to develop new antimicrobial compounds. Since antiquity, plants have been used to treat common infectious diseases. The healing potential of many plants have been utilized by Indian traditional medicines like Siddha, Ayurvedha and Unani. Being nontoxic and easily affordable, there has been resurgence in the consumption and demand for medicinal plants (Jayashree and Maneemegalai, 2008). *Cassia auriculata* L. commonly known as tanners cassia, also known as "avaram" in Tamil language is a shrub belongs to the Caesalpiniaeeae family. The shrub is especially famous for its attractive yellow flowers which are used in the treatment of skin disorders and body odour. It is widely used in traditional medicine for rheumatism, conjunctivitis and diabetes. It has many medicinal properties. Its bark is used as an astringent, leaves and fruits anthelmintic, seeds used to treat in eye troubles and root employed in skin diseases (Siva

and Krishnamurthy, 2005). It is also used for the treatment of ulcers, leprosy and liver disease (Kumar *et al.*, 2002). The antidiabetic, hypolipidemic (Umadevi *et al.*, 2006) and antioxidant (Kumaran and Karunakaran, 2007) and hepatoprotective (Kumar *et al.*, 2003) effect of *Cassia auriculata* L. have been reported. It was also observed that flower and leaf extract of *Cassia auriculata* L. shown to have antipyretic activity (Vedavathy and Rao, 1991). The aim of the present study was to determine the antibacterial activity of various extracts of *Cassia auriculata* L. flowers which is having traditional claims for several diseases Because of the close morphological similarity, non-availability of scientific parameters to identify the true plant material and to ensure its quality, the present work has been undertaken to establish the antimicrobial potential of the plant, which could serve as a measure of selection of *Cassia auriculata* Linn. for the treatment of various diseases.

MATERIALS AND METHODS

Procurement and authentication of plant

The root of the plant *Cassia auriculata* L. was collected from fields of Walgaon Road, Amravati, Maharashtra and interiors of Bhopal, Madhya Pradesh respectively. The plant has been authenti-

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cated by Safia College of Science, Peer Gate, Bhopal, (Madhya Pradesh), and were given the voucher specimen number 159/Bot/Safia/2010. The authenticated roots were dried under shade and then coarsely powdered with the help of mechanical grinder. The powdered was passed through sieve no. 40 and stored in an airtight container for extraction.

Preparation of saponins rich fraction

Roots of the plant were collected and dried. Pulverized plant material (roots of *Cassia auriculata* Linn.) was treated with ethanol: water (70:30) for maceration till seven days after defatting with petroleum ether (40:60). Mixture was agitated at regular interval in this period. Obtained extract after filtration with muslin cloth followed by filter paper was concentrated using rotary vacuum evaporator (40°C), precaution was kept that extract do not get powdered. Concentrated extract was further treated with n-butanol to get n-butanol soluble fraction. n-butanol soluble fraction was further treated with chilled diethyl ether. After treating with chilled diethyl ether, precipitates were formed. This mixture with precipitate was kept at -20°C for 24 hrs. Precipitates were further separated by centrifugation. These precipitate were further dissolved in methanol and methanol was evaporated slowly, to get crystalline powder (Aliyu *et al.*, 2011; Cibin *et al.*, 2006; Cabrini *et al.*, 2008)

Antimicrobial activity of extract

Stock solution sample was prepared (1mg /ml) then the dilution dilutions of 50%, 37.5%, 25% and 12.5% were prepared. Wells of 6mm was prepared using a sterile cork borer. Bacterial culture were grown using sterile cotton swab method. Then the plates were inoculated and 80 µl of each dilution sample was poured in respected wells and plates were incubated for 16- 18 hrs at 37°C. After 16 to 18 hours of incubation, each plate was examined. The diameters of the zones of complete inhibition are measured, including the diameter of the disc (Bansal and Bansal, 2010; Jain, 2005).

RESULTS AND DISCUSSION

Antimicrobial activity of saponins rich fraction of *Cassia auriculata* L. root was investigated against *P. vesicularis*, *Streptococcus faecalis*, *Aeromonas hydrophilia*, *Salmonella typhae*, *Staphylococcus cohni*, *Serratia*

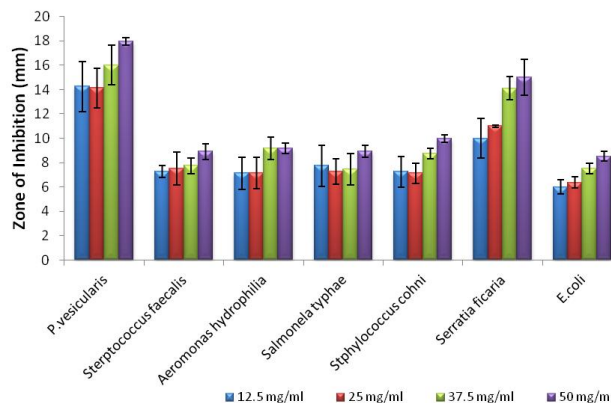


Figure 1: Antimicrobial activity of *Cassia auriculata* Linn. saponins rich fraction.

ficaria and *E. coli* at concentrations of 12.5 mg/ml, 25 mg/ml, 37.5 mg/ml and 50 mg/ml. Antimicrobial effect was ascertained on the basis of zone of inhibition.

Saponin rich extract of *Cassia auriculata* L. showed best antimicrobial activity against *P. vesicularis* and least against *E. coli* at 50 mg/ml. At 12.5 mg/ml zone of inhibition for *P. vesicularis* was 14.25±2.04 mm which was significantly higher ($P<0.05$) as compared to effect on other microorganism at same concentration. Similarly at 25 mg/ml effect on *P. vesicularis* was significantly better ($P<0.05$) as compared to other microorganisms. At 12.5 mg/ml effect against *Aeromonas hydrophilia* showed zone of inhibition 7.12±1.31mm which was least as compared to all other microorganism except to *E. coli*, but at 50 mg/ml least effect was observed for *Streptococcus faecalis* with zone of inhibition for *Streptococcus faecalis* (8.90±0.66) was least as compared to all other microorganism except to *E. coli*. Thus at 50 mg/ml antimicrobial effect of Saponin rich extract can be arranged in sequence of - *P. vesicularis*> *Serratia ficaria*> *Streptococcus cohni*> *Aeromonas hydrophili*> *Salmonella typhae*> *Sterptococcus faecalis*> *E. coli*.

Saponins are glycosides of triterpenes, steroids or steroidal alkaloids; they are regarded as natural antimicrobial compounds with very diverse biological activities whose roles in food, animal feed stuffs and pharmaceutical applications have been useful to man. Saponins have been implicated as bioactive antibacterial agents of plants containing them. Another study indicates the antibacterial sensitivity of saponins more on gram negative than gram

positive. Although variations in the chemical nature of the saponins from different plants reported in the literature, may perhaps explain the variation in activity against various pathogens. Saponin compounds in plant are believed to naturally protect it against attack from pathogens, which would account for their antimicrobial activity. The mode of action of antibacterial effects of saponins may involve membranolytic properties, rather than simply altering the surface tension of the extracellular medium (Aliyu *et al.*, 2011).

CONCLUSION

The present study exhibited the antimicrobial effect of saponins rich fraction of roots of *Cassia auriculata* L. The inhibitory effect of the extract justified the medicinal use of *Cassia auriculata* L. and further study is required to find out the active component of medicinal value.

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