Evaluation of in vitro antimicrobial activity of extracts from Cassia obtusifolia L. and Senna sophera (L.) Roxb against pathogenic organisms

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ABSTRACT

Cassia species have been of medicinal interest due to their good therapeutic value in folk medicine. In the present study petroleum ether, ethanol and chloroform extracts from leaf and stems of Cassia obtusifolia and Senna sophera were investigated for their antimicrobial activities against some pathogenic microbes in vitro. The C. Obtusifolia leaf extracts in pet ether and chloroform showed more sensitivity against E. faecalis (MIC 0.2725mg/ml and MIC 0.2647) and ethanol extracts against A. fumigatus (MIC 0.3116mg/ml). Similarly the stem extracts of C. Obtusifolia in pet ether showed more sensitivity against E. faecalis (MIC 0.407mg/ml), ethanol extracts against E. faecalis (MIC 0.3009mg/ml) and chloroform extracts against E. faecalis MIC 0.4946mg/ml). The leaf extracts of S. sophera in pet ether showed more sensitivity against C. albicans (MIC 0.3524mg/ml), ethanol extracts against E. faecalis (MIC 0.2738mg/ml) and chloroform extracts against C. Albicans (MIC 0.4239). S. sophera stem extracts in Pet ether showed more sensitivity against E. faecalis (MIC 0.254mg/ml), ethanol extracts against E. faecalis (MIC 0.2987mg/ml) and chloroform extracts against E. faecalis (MIC 0.5899mg/ml). This finding provides an insight into the usage of the leaves of Cassia species in traditional treatment of wounds or burns associated with bacterial and fungal infections. However, further work is needed in the form of phytochemical screening and pharmacological activity of some more extracts before one could conclude anything definite about the therapeutic potential of these extracts.

INTRODUCTION

Increased development of resistance to drugs by human pathogenic microbes forced the investigators to search new antimicrobials from various natural sources like medicinal plants (Tomoko et al., 2000; Doshi et al., 2011). Medicinal plants have been used to treat common infectious diseases for centuries and some of them are the source of traditional medicines (Raja, 2013). The use of plant extracts and photochemical both with known antimicrobial properties are of great significance. The plants are rich in wide variety of secondary metabolites such as tannins, terpenoids, alkaloids, flavonoids, etc. Which have been found to have vast antimicrobial properties in vitro (Cowan, 1999). In the past decades a number of investigations have been conducted worldwide. Among more than 250000 species of higher plants only 5-10% are chemically investigated (Nahristed, 1996). World Health Organization (WHO) encourages countries to examine traditional medicine for providing safe and effective remedies for different diseases (Akinyemi et al., 2002). Cassia species have been of medicinal interest due to their good therapeutic value in folk medicine. Cassia obtusifolia is an annual herb belongs to leguminosae native to tropical regions and grows throughout china US and elsewhere. The seeds of C. Obtusifolia have been used treat the eye problems, It lowers the cholesterol and blood pressure and prevents the formation of atherosclerotic plaque in the arterial wall and it also has the laxative and antibacterial effects. Senna sophera (L.) Roxb formerly called Cassia sophera is a shrub probably originated in India found in most tropical countries. It has been used in treating various respiratory disorders. In the present study leaves and stem extracts of C. Obtusifolia and S. sophera have been evaluated for their antimicrobial activity under laboratory conditions.

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MATERIALS AND METHODS

Plant material and extracts preparation

The leaves of \textit{C. obtusifolia} and \textit{S. sophera} were collected from in and around Bagalkot Dist located in North Karnataka region, in the month of September–October. A voucher specimen (BSC/Pharmacy/2015/1/12) was stored in the department for future reference. Leaves and stem were shade dried at room temperature. The shade dried and coarsely powdered plant material were successively extracted with petroleum ether (60-80°C), Chloroform and ethanol using Soxhlet apparatus. The extracts were dried under reduced pressure at temperature of 30°C, to yield dried extract residue.

Antibacterial and antifungal activity

All the extracts were evaluated for antimicrobial activity against few clinical isolates, by serial dilution method in duplicate (Koneman, 1995). Antimicrobial activity tested against \textit{Staphylococcus aureus} (ATCC 25923), \textit{Enterococcus faecalis} (ATCC29212), \textit{Klebsiella} sp. (ATCC-1705), \textit{Escherichia coli} (ATCC 2922) and antifungal activity against \textit{Aspergillus fumigatus} (ATCC102) and \textit{Candia albicans} (ATCC10231).They are grown on blood agar media, sub cultured and isolated. On the other hand control strains of same organisms were also developed in suitable culture media. The inoculum of both control strains and clinical isolates were standardized by adjusting to McFarld scale in suitable culture media. The inoculum of both control strains and other hand control strains of same organisms were also developed were grown on blood agar media, sub cultured and isolated. On the other hand control strains of same organisms were also developed in suitable culture media. The inoculum of both control strains and clinical isolates were standardized by adjusting to McFarld scale in suitable culture media.

\begin{table}[h]
\centering
\caption{Antimicrobial activity of plant extracts by \textit{C. obtusifolia} against pathogens.}
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textbf{Plant material} & \textbf{Extracts} & \textbf{S. aureus} & \textbf{E. faecalis} & \textbf{A. fumigatus} & \textbf{E. coli} & \textbf{Klebsiella sp.} & \textbf{C. albicans} \\
\hline
\textbf{leaf extract} & Pet ether & 0.38425 & 0.3563 & 0.4581 & 1.395 & 0.5914 & 0.3524 \\
 & Alcohol & 0.3193 & 0.2738 & 0.3802 & 1.4172 & 0.8453 & 0.3578 \\
 & Chloroform & 0.5523 & 0.426 & 0.5999 & 1.3391 & 1.0101 & 0.4239 \\
\hline
\textbf{stem extract} & Pet ether & 0.3342 & 0.254 & 0.6343 & 1.1314 & 0.8815 & 0.3526 \\
 & Alcohol & 0.5069 & 0.29871 & 0.8858 & 1.1254 & 1.4421 & 0.4807 \\
 & Chloroform & 0.7472 & 0.5899 & 0.6066 & 1.4167 & 1.5215 & 0.6421 \\
\hline
\end{tabular}
\end{table}

\begin{table}[h]
\centering
\caption{Antimicrobial activity of plant extracts by \textit{S. sophera} against pathogens.}
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
\textbf{Plant material} & \textbf{Extracts} & \textbf{S. aureus} & \textbf{E. faecalis} & \textbf{A. fumigatus} & \textbf{E. coli} & \textbf{Klebsiella sp.} & \textbf{C. albicans} \\
\hline
\textbf{Leaf extract} & Pet ether & 0.3639 & 0.2725 & 0.6287 & 0.9574 & 1.0605 & 0.4834 \\
 & Alcohol & 0.4317 & 0.3402 & 0.3116 & 1.1819 & 0.4211 & 0.394 \\
 & Chloroform & 0.2938 & 0.2647 & 0.4006 & 1.144 & 0.549 & 0.4834 \\
\hline
\textbf{Stem extract} & Pet ether & 0.4534 & 0.407 & 0.4946 & 1.397 & 0.6393 & 0.5062 \\
 & Alcohol & 0.3791 & 0.3009 & 0.3168 & 1.3709 & 0.618 & 0.3058 \\
 & Chloroform & 0.4534 & 0.407 & 0.4946 & 1.397 & 0.6393 & 0.5062 \\
\hline
\end{tabular}
\end{table}

RESULTS AND DISCUSSION

Leaf extracts of \textit{C. obtusifolia} in pet ether showed more activity against \textit{E. faecalis} (MIC 0.2725 mg/ml) and least sensitivity against \textit{Klebsiella} sp. (MIC 1.0605 mg/ml). The ethanol extracts from \textit{C. Obtusifolia} showed more sensitivity against \textit{A. fumigatus} (MIC 0.3116mg/ml) and the chloroform extract was more sensitive against \textit{E. faecalis} (MIC 0.2647mg/ml). Similarly the stem extracts of \textit{C. Obtusifolia} in pet ether showed more sensitivity against \textit{E. faecalis} (MIC 0.407mg/ml), ethanol extracts against \textit{E. faecalis} (MIC 0.3009) and chloroform extracts against \textit{E. faecalis} (MIC 0.4946mg/ml) Table 1.

The leaf extracts of \textit{S. sophera} in pet ether showed more sensitivity against \textit{C. Albicans} (MIC 0.3524mg/ml), ethanol extracts against \textit{E. faecalis} (MIC 0.2738mg/ml) and chloroform extracts against \textit{C. Albicans} (MIC 0.4239). \textit{S. sophera} stem extracts in Pet ether showed more sensitivity against \textit{E. faecalis} (MIC 0.254mg/ml), ethanol extracts against \textit{E. faecalis} (MIC 0.2987mg/ml) and chloroform extracts against \textit{E. faecalis} (MIC 0.5899mg/ml) Table 2. \textit{Cassia} species containing anthraquinone, flavonoids and reducing sugar showed considerable antimicrobial activity against gram positive microorganisms (Abo et al., 1998). The in vitro antimicrobial activities from extracts by \textit{Cassia} species have been reported from various parts of the world (Anushia et al., 2009). In our previous study leaf and stem extracts from \textit{Cassia glauca} showed antimicrobial activity against bacterial and fungal pathogens in vitro (Kittur et al., 2015). This finding provides an insight into the usage of the leaves of \textit{Cassia} species in traditional treatment of wounds or burns associated with bacterial and fungal infections. However, further work is needed in the form of phytochemical screening and pharmacological activity of some more extracts before one could conclude anything definite about the therapeutic potential of these extracts.
REFERENCES


Cowan MM. Plant products as antimicrobial agents. Clinical microbiology reviews, 1999; 12: 564-82.


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