Abstract

The antibacterial and DPPH radical scavenging activities of the leaf extracts of & D V V L D ¿ V Wre XG D / L Q Q investigated. The antibacterial potential of the petroleum ether, chloroform, ethyl acetate and methanol extracts of the leaves of & D V V L D ¿ V were studied against human pathogenic bacteria viz. % D F L O O X V F H U H X V (Q W H U R E D F I D H F D O L V 6 D O P R Q H O O D S D U D W \ S K L 6 W D S K \ O R F R F F X V D X U H X V (V F K H U L F K L D F R 3 V H X G R P R Q D V -¥ Ê-ªQ$q´Q,¡àX V À ` À Á À LR (uid="1052>]TJ EMC -1.2 Td [(invgated. )1is is a>-36G ar471 <</MCID 1512 & H` „¢ þ¼’

Keywords:Cassia stula; Antibacterial activity; Agar well di usion method; DPPH radical scavenging activity; Drug formulations

Introduction

Cassia stula L., (Leguminosae), a semi-wild Indian Labernum (also known as the Golden Shower), is distributed in various countries including Asia, South Africa, Mexico, China, West Indies, East Africa and Brazil. It is an ornamental tree with beautiful bunches of yellow owers [1]. Cassia stula plant parts are known to be an important source of secondary metabolites, notably phenolic compounds [2]. e herb contains anthraquinones, avonoids and avan-3-ol derivatives [1]. e seeds are rich in glycerides with linoleic, oleic, stearic and palmitic acids as major fatty acids together with traces of caprylic and myristic acids [3]. Besides phenolics and their derivatives, a certain amount of alkaloids have also been reported in the owers [4], while traces of triterpenes have been observed in both owers and fruits. Four new compounds, 5-(2-hydroxyphenoxymethyl) furfural, (2'S)-7-hydroxy-5-hydroxymethyl-2-(2'-hydroxypropyl) chromone, benzyl-2-hydroxy-3, 6-dimethoxybenzoate, and benzyl 2 -O-D-glucopyranosyl-3,6-dimethoxy benzoate, together with four known compounds, 5-hydroxymethylfurfural, (2'S)-7-hydroxy-2-(2'-hydroxypropyl)-5-methylchromone, and two oxyanthraquinones, chrysophanol and chrysophanein, were also isolated from the seeds of Cassia stula [5].

e whole plant possesses medicinal properties useful in the treatment in ammatory diseases, rheumatism, anorexia and jaundice [6]. Singh SK and Singh S [7] isolated Cassia stula seed mucilage and evaluated the potential of the mucilage as a binder for conventional tablet formulations. A new bioactive avone glycoside 5,3',4'-tri-hydroxy-6-methoxy-7-O- -L-rhamnopyranosyl-(1 2)- O- -D-galactopyranoside with antimicrobial activity was reported [8]. Anti-in ammatory and antioxidant activities of the aqueous and methanolic extracts of the Cassia stula Linn. bark were assayed in albino rats [9]. It has been reported that the stem bark of Cassia stula is also a potential source of lupeol, -sitosterol and hexacosanol [10].

e plant has a high therapeutic value and it exerts an antipyretic and

*Corresponding author: Beena Jose, Department of Chemistry, Vimala College, Thrissur, Kerala, 680009, India, E-mail: drbeenajose@rediffmail.com

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e percent of inhibition of DPPH reduction (decolourization)

$$\% \text{ of inhibition} = \frac{A_0 - A_{sample}}{A_0} \times 100$$

where (A_0) is the absorbance of the control (blank) and (A_{sample}) is

a er a certain time, corresponds inversely to the radical scavenging activity of the antioxidant. e results of the free radical scavenging activity of the leaf extracts Cassia stula assessed by DPPH assay and amount of the sample needed for 50% inhibition of free radical activity, IC_{50} values were summarized in Table 3.

Discussion

Antibacterial screening of leaf extracts

As can be seen from Table 1, the leaf extracts Cassia stula showed pronounced antibacterial activity against all the microorganisms tested. Among the leaf extracts, methanol extract exhibited higher activity than the other extracts and petroleum ether extract showed least activity. Methanol (18-32 mm/50 µl inhibition zone), ethyl acetate (14-22 mm/50 µl inhibition zone), chloroform (13-16 mm/50 µl inhibition zone) and petroleum ether (12-14 mm/50 µl inhibition zone) extracts of the leaf exhibited marked activity against all the tested organisms such as Bacillus cereus, Enterobacter faecalis, Salmonella paratyphi, Staphylococcus aureus, Escherichia coli, Proteus vulgaris, Klebsiella pneumoniae, Pseudomonas aeruginosa and Serratia marcescens.

e leaf methanol extract exhibited signi cant activity against Bacillus cereus (32 mm/50 µl inhibition zone), Enterobacter faecalis (26 mm/50 µl inhibition zone), Staphylococcus aureus (28 mm/50 µl inhibition zone), Proteus vulgaris (24 mm/50 µl inhibition zone), Klebsiella pneumonia (26 mm/50 µl inhibition zone), Pseudomonas aeruginosa (24 mm/50 µl inhibition zone), Salmonella paratyphi (26 mm/50 µl inhibition zone), Escherichia coli (27 mm/50 µl inhibition zone), Serratia marcescens (24 mm/50 µl inhibition zone) and Proteus mirabilis (24 mm/50 µl inhibition zone) (Table 1). e leaf petroleum ether extract exhibited activity against Bacillus cereus (12 mm/50 µl inhibition zone), Enterobacter faecalis (14 mm/50 µl inhibition zone), Staphylococcus aureus (12 mm/50 µl inhibition zone), Proteus vulgaris (12 mm/50 µl inhibition zone), Klebsiella pneumonia (12 mm/50 µl inhibition zone), Pseudomonas aeruginosa (12 mm/50 µl inhibition zone), Salmonella paratyphi (12 mm/50 µl inhibition zone), Escherichia coli (12 mm/50 µl inhibition zone), Serratia marcescens (12 mm/50 µl inhibition zone) and Proteus mirabilis (12 mm/50 µl inhibition zone) (Table 1). e leaf chloroform extract exhibited activity against Bacillus cereus (16 mm/50 µl inhibition zone), Enterobacter faecalis (14 mm/50 µl inhibition zone), Staphylococcus aureus (16 mm/50 µl inhibition zone), Proteus vulgaris (13 mm/50 µl inhibition zone), Klebsiella pneumonia (14 mm/50 µl inhibition zone), Pseudomonas aeruginosa (13 mm/50 µl inhibition zone), Salmonella paratyphi (14 mm/50 µl inhibition zone), Escherichia coli (14 mm/50 µl inhibition zone), Serratia marcescens (13 mm/50 µl inhibition zone) and Proteus mirabilis (13 mm/50 µl inhibition zone) (Table 1). e leaf ethyl acetate extract exhibited activity against Bacillus cereus (22 mm/50 µl inhibition zone), Enterobacter faecalis (20 mm/50 µl inhibition zone), Staphylococcus aureus (22 mm/50 µl inhibition zone), Proteus vulgaris (14 mm/50 µl inhibition zone), Klebsiella pneumonia (20 mm/50 µl inhibition zone), Pseudomonas aeruginosa (20 mm/50 µl inhibition zone), Salmonella paratyphi (20 mm/50 µl inhibition zone), Escherichia coli (20 mm/50 µl inhibition zone), Serratia marcescens (20 mm/50 µl inhibition zone) and Proteus mirabilis (20 mm/50 µl inhibition zone) (Table 1).

/T1_1 1 T1MCl5gso 4 ></MuCassi265l inhD 500 >>BDC /T1_1 1 T

Conclusions

e leaf extracts of Cassia stula showed varying degrees of antibacterial activity on the microorganisms tested. It is interesting to note that even crude extract of this plant showed prominent activity against various pathogenic bacteria where modern therapy has failed. Due to the emergence of the antibiotic resistant pathogens, plants are being looked upon as an excellent alternate to combat the spread of multi drug resistant microorganisms.

From the above experiment it can be inferred that leaf methanol extract of Cassia stula showed signi cant activity against Gram-positive and Gram-negative bacteria. e activity of leaf methanol extract was found to be quite comparable with the standard antibiotics screened under similar conditions. So they can be used as an external antiseptic in the prevention and treatment of bacterial infections caused by various pathogenic bacteria such as Bacillus cereus, Enterobacter faecalis, Salmonella paratyphi, Staphylococcus aureus, Escherichia coli, Proteus vulgaris, Klebsiella pneumoniae, Pseudomonas aeruginosa and Serratia marcescens, which have developed resistance to antibiotics. e incorporation of these samples into the drug formulations is also recommended. is study demonstrated that the methanolic leaf extract of Cassia stula is as e ective as modern medicine to combat pathogenic microorganisms.

Among the leaf extracts of