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Phytochemical and antimicrobial evaluation of *Abrus precatorius* L.

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ABSTRACT

Medicinal plants play an important role in the discovery of novel drugs used in modern medicine. The medicinal plant Abrus precatorius. L whole plant possesses the wide range of medicinal properties which were confirmed through literature reviews. The present study was to determine the plant extracts have antimicrobial activities and also to check whether their phytochemical constituents responsible for said activities. This study involves the preliminary phytochemical screening separation and identification of compounds. The plant extracts were subjected to test the antimicrobial activity by disc diffusion method. The phytochemical screening of plant extract showed the presence of alkaloids, glycosides, flavonoids, phenols and other phytochemical compounds than antimicrobial activities.

INTRODUCTION

The word "Phyto" is the Greed word for plant. Phytochemicals, which not only that they are nonnutritive. Phyto chemicals that have protective or disease preventive properties but also protect human from a host of diseases [1]. From thousands of years, plants have been utilized as medicines. Major constituents of more than 50% of all the drugs in clinical use are natural products and their derivatives [2]. Medicinal herbs constitute effective sources of antimicrobial and antioxidant natural products[3]. Medicinal herbs are an important source for the therapeutic remedies of various ailments [4]. Plant was used as anthelmintic, astringent and also used for dysentery, snake bite, fever, inflammation and rheumatism. Biological activities such as analgesic, anti-inflammatory and ulcerogenic were reported for more research scholars and scientist. There has been an growing interest in the study of medicinal plants as natural products in diverse parts of the world[5]. Medicinal plants containing active chemical constituents with high antioxidant property play an important role in the prevention of various degenerative diseases [6].

Bacterial infection is one of the most serious global health issues in 21st century. The emergence of bacterial resistance to antibiotics is a major health problem and therefore, it is critical to develop new antibiotics with novel mechanism of action to overcome these problems [12]. Medicinal plants were used as excellent antimicrobial agents because it poses a variety of chemical constituent is nature recently much attention has directed towards extracts and biologically active compounds isolated from popular plant species [14]. Today natural products derived from plants are being tested for presence of new drugs with new modes of pharmacological action [7].

The aim of the present study is to investigate phytochemicals constituents of *Abrus precatorius. L* by preliminary phytochemical analysis and antimicrobial studies.

MATERIALS AND METHODS

Collection of plant materials

Abrus precatorius. L collected at Thottiam village, Tiruchirappalli District. The plant materials were identified by botanically. The plant materials were shaded and dried until all the water molecules evaporated and plants became well dried for grinding. After drying, the plant materials were grinded well using mechanical blender into fine powder and transferred into air tight container with proper labeling [7].

Preparation of plant extracts

Soxhlet extraction

Crude plant *Abrus precatorius. L* extracts were extracted by Soxhlet extraction method [8]. About 150 gm of powdered plant materials were uniformly packed into a thimble and extracted with 500 ml of using different solvents. Methanol was used as solvent. The process of extraction continues for 24 hours till the solvent in siphon tube of an extractor become colorless. After that the extract was taken in a beaker and kept on hot plate and heated at 30-40 ºC till all the solvent got evaporated. Dried extract was kept in refrigerator at 4 ºC for phytochemical analysis.

Antimicrobial and fungal activity

The effects of plant extracts on the several bacterial strains and fungal strains were assayed by Agar well diffusion method. The minimum concentrations of the plant extracts to inhibit the microorganisms were also determined by micro dilution method using plant fractions serially diluted in sterile nutrient broth. C*iproflaxin* (2µg/disc) and *Fluconozale* (10µg/disc) were used as reference drugs for bacteria and fungi respectively.

Qualitative phytochemical analysis

Test for Alkaloids (Mayer's Test)

The extract of *Abrus precatorius. L* was evaporated to dryness and the residue was heated on a boiling water bath with 2% Hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Meyer's reagent. Yellow colour was observed. It indicates that the presence of Alkaloids.

Test for Tannins

0.5 ml of extract solution 1 ml of distilled water and 1-2 drops of ferric chloride solution was added. Blue colour was observed for Gallic tannins and green black for catecholic tannins [9].

Test for Terpenoid and Steroid

4 ml of extract was treated with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. Then concentrated solution of sulphuric acid was added slowly. Red violet colour was observed for terpenoid and green bluish colour for steroids [11].

Test for reducing sugars

0.5 ml of extract solution 1 ml of distilled water and 5-8 drops of fehling's solution was added and heated. The brick red precipitate was formed. Hence reducing sugar was identified.

Test for Glycoside

The plant extract 5ml is mixed with glacial acetic acid, few drops of ferric chloride and concentrated sulphuric acid are added and observed for reddish brown colouration at the junction of two layers and the bluish green colour in the upper layer was formed. It indicates the presence of glycosides.

Test for saponins

The plant extract 50ml was diluted with 20 ml of distilled water and it was agitated in a graduated cylinder for 15 minutes. The formation of 1 cm layer of foam showed the presence of saponins.

Test for Flavonoids

1 ml of the plant extract and a few drops of dilute sodium hydroxide were added. An intense yellow colour was produced which become colourless on addition of a few drops of dilute acid indicates the presence of flavonoids [9].

Test for Phenolic compounds

The plant 5 ml was dissolved in distilled water. Then few drops 1% lead acetate was added. A bulky white precipitate was formed, which indicates that the presence of phenolic compounds.

RESULTS AND DISCUSSION

Preliminary phytochemical analysis

Qualitative preliminary screenings of extracts were performed initially with different chemical reagents to detect the phytochemical constituents present in methanol and aqueous extracts. *Abrus precatorius. L* was evaluated for preliminary phytochemical screening standard procedure. Preliminary phytochemical screening showed the presence of various classes of secondary metabolites such as alkaloids, flavonoids, phenols, saponins, glycosides, tannins, carbohydrate and terpenoids. The reports are presented in table – 1.

Antimicrobial studies

The different concentration methanol extract of *Abrus precatorius. L p*lant shows antimicrobial activity against the tested organisms in the order of *Staphylococcus aureus(14 mm), Vibrio cholera(16 mm), Yersinia enterocolitica(13 mm), Salmonella typhi(16 mm),, Bacillus subtilis(17 mm), Listeria monocytogenes(15 mm), Klebsiella pneumonia(18 mm), Bacillus megaterium(15 mm).* In case of fungi activity against tested organisms was in the order of *Aspergillus niger (16 mm), Candida albicans(14 mm).* In case of the maximal antibacterial activity was observed against *Klebsiella pneumonia*. The results are furnished in Table - 2.

Table 1: Preliminary phytochemical analysis of *Abrus precatorius. L*

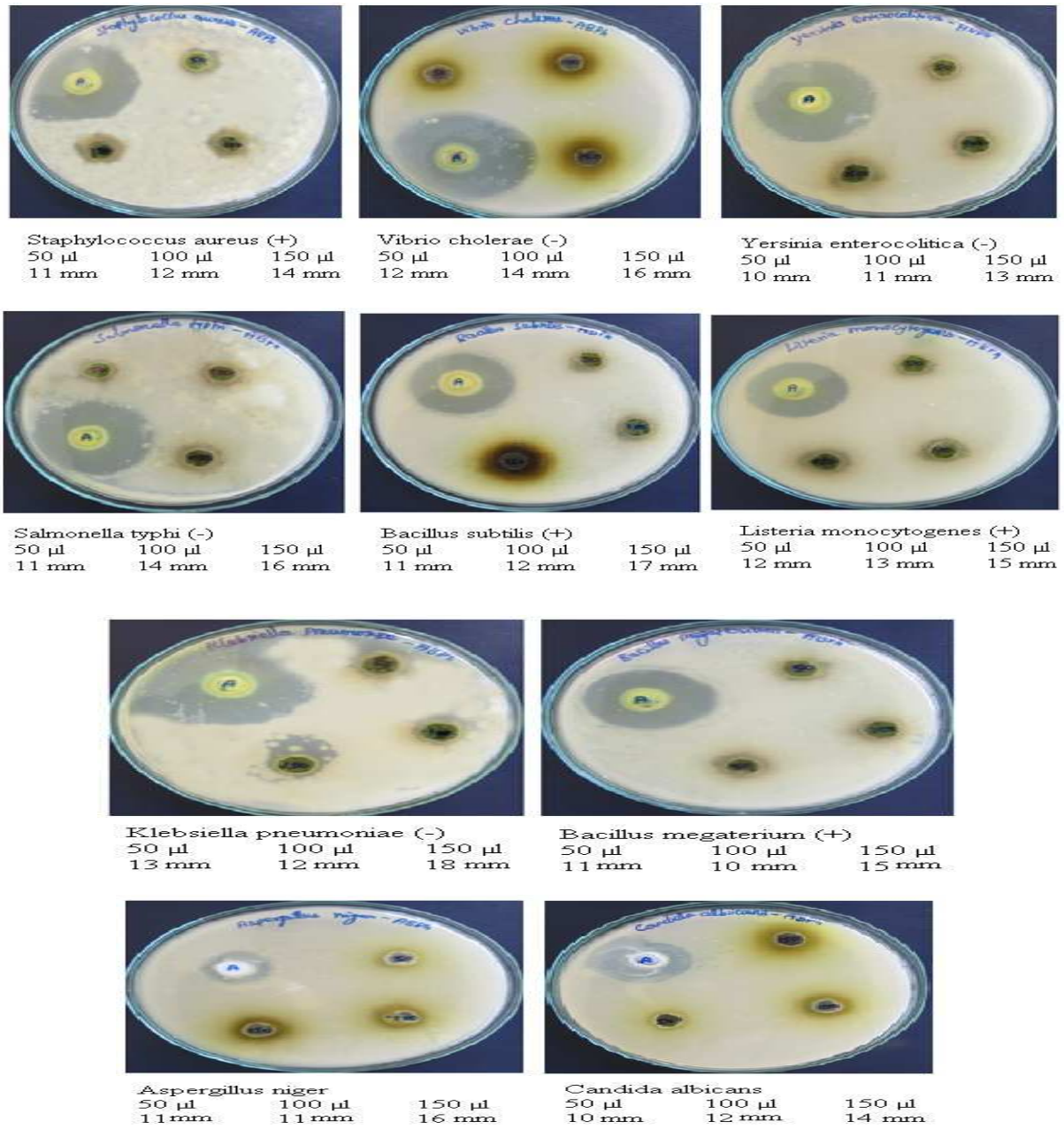
S. No	Phytochemical constituents	Name of the Test	Methanol Extract	Aqueous Extract
1	Alkaloid	Mayer's test Dragondraff test Wagner Test	+ + +	-
2	Carbohydrate	Molish Test Fehling Test Benedicts Test	- + +	- - -
3	Steroidal Glycosides	Libermann's test Salkowaski test	- +	- +
4	Saponin	Foam Test	+	-
5	Tannin	Lead Acetate	+	+
6	Pseudo tannins	Ferric chloride.	Condensed tannin	Condensed tannin
7	Chlorogenic acid	Ammonia test	-	-
8	Flavones	Shinoda's Test	+	-
9	Flavonoid	Ammonia test	+	-
10	Coumarin	Sodium chloride test	-	-
11	Anthocyanin	H_2SO_4 test	-	-
12	Anthracene Glycoside	Borntrager's test	-	-
13	Terpenes	H_2SO_4 test	+	-
14	Phenols	Ferric chloride	+	+
15	Glycosides	Liberman test	+	-

+ = present ++ = moderate +++ = high - = absent

TABLE 2: Antimicrobial Activity of *Abrus* precatorius. L in methanolic Extract

S. No	*Name of the Organisms*	*Concentration of* Methanolic *extract added and Zone of inhibition (mm/ml)*			
		A	*50 µl*	*100 µl*	*150 µl*
1	*Staphylococcus aureus* (+)	*31*	*11*	*12*	*14*
2	*Vibrio cholerae* (-)	*35*	*12*	*14*	*16*
3	*Yersinia enterocolitica* (-)	*38*	*10*	*11*	*13*
4	*Salmonella typhi* (-)	*35*	*11*	*14*	*16*
5	*Bacillus subtilis* (+)	*31*	*11*	*12*	*17*
6	*Listeria monocytogenes* (+)	*32*	*12*	*13*	*15*
7	*Klebsiella pneumoniae* (-)	*34*	*13*	*12*	*18*
8	*Bacillus megaterium* (+)	*33*	*11*	*10*	*15*
9	*Aspergillus niger*	*17*	*11*	*11*	*16*
10	*Candida albicans*	*24*	*10*	*12*	*14*

Figure: Antimicrobial activity of *Abrus precatorius. L*



CONCLUSION

The methanol and aqueous extracts of plant contains many bioactive chemical constituents' alkaloids, flavonoids, phenols, saponins, glycosides, tannins, carbohydrate and terpenoids. *Abrus precatorius. L* was effective against both gram positive, gram negative bacteria. Therefore it can be concluded that antimicrobial activity of *Abrus precatorius. L* against bacteria shows its medicinal value and supports the widespread use of the plant as local remedy for a variety of ailments ranging from ulcers to bronchitis.

REFERENCES

[1] Suleiman M. N, *Der Pharmacia Sinica*, **2011**, *2 (4):108-111.*

[2] Satwinderjeet kaur, Subodh kumar, *American Journal of Biomedical Sciences* , **2010**, 2(2):164-177.
[3] Calixto, B.J, *Brazilian journal of Medicinal and Biological Research*, **2000**, 33(2): 179 – 189.
[4] Moses A.G, Maobe, *European journal of Applied Science*, **2013**, 5 (1): 01-06.
[5] Rajeswari G, Murugan M and Mohan VR, *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. **2012**, 3(4): 301-308.
[6] Rajeev Nema, *International journal of Pharm.Phytochemical.Res*, **2012**,1(5): 283-286.
[7] Charles A, Leo Stanly A, Joseph M, Alex Ramani V, *Asian J.Plant. Sci.Rec*.,**2011**, 1(4): 25 – 32.
[8] Lalitha P, *Asian.J.Plant Sci.Res*.,**2012**, 2 (2): 115 – 122.
[9] Sathyaprabha G, *Journal of pharmacy Research*, **2010**,3(12):2970 -2973.
[10] Siddiqui A .A and Ali, M. Practical pharmaceutical chemistry. *First edition, CBS Publishers and distributors, New Delhi*, **1997**: 126 – 131.
[11] Anjana Sharma, Rani Verma and Padmini Ramteke, *Applied Sciences Journal*, **2009**, 7 (3): 332-339.
[12] Zahir Hussain A and Aruna Ignatiust, *Asian Journal of chemistry*, **2010**, 22(5): 3596 – 3600.
[13] Hosamani P.A , Lakshman H.C and Sandeepkumar K, *Life Science Leaflets* **2012**, 8: 35 – 39.
[14] Alo M N, Anyim C, Igwe J C, Elom M, and Uchenna D S. *Advances in Applied Science Research*, **2012**, 3 (2): 844-848.
[15]. Elavarasan R and Senthil Kumar R. *Int.J.Pharma.Sci. and Res*. **2012**, 3: 1516 – 1519.