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RESEARCH ARTICLE

ANTIMICROBIAL ACTIVITY OF FRUITS OF *PRUNUS ARMENIACA* (L.)

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ABSTRACT

P*runus armeniaca* (L.) is known as apricot. It belongs to family *Rosaceae*. It is a hard tree bearing stone fruit which is closely related to peach. It is found in Asia, Europe, North America, China, Maharashtra, and Himachal Pradesh.
The present study describes the antimicrobial activity of ethanolic and aqueous extracts of fruits of P*runus armeniaca* (L.). These activities were tested against human pathogenic microorganisms using disc diffusion method and zone of inhibition of each active extract was determined. The most effective antibacterial activity was observed in the ethanolic extract of fruits against *Staphylococcus aureus* and *Bacillus subtilis*. Additionally, the ethanolic extract was effective against *Proteus vulgaris* and *Escherichia coli.* Significant activity against *Candida albicans* was also observed with the ethanolic extract. The ethanolic extract showed more significant antimicrobial activity as compared to aqueous extract.
Key Words: Prunus, armeniaca, rosaceae, antimicrobial

INTRODUCTION:

A large number of medicinal plants are claimed to be useful in bacterial and fungal diseases in all traditional system of medicine and folklore. While these plants are require proving scientifically. The apricot (P*runus armeniaca* L.) is a member of the Rosaceae family[1,2]. Apricot fruit being a rich source of vitamins & minerals is one of the most familiar crops worlds wide. Apricot trees are not ubiquitous since they can only grow in certain regions where the environmental conditions are favourable. In general P*runus armeniaca* (L.) is used in folk medicine in the treatment of skin diseases[3,4] & parasitic diseases [5,6]. As a part of search for new biological activity of a plant extracts preliminary bioscreening[7] were performed to evaluate the antibacterial and antifungal activity of ethanolic and aqueous extracts of P*runus armeniaca* (L.).

MATERIALS AND METHODS

The plant ***Prunus armeniaca* (L.)** has been collected from private farm of Simla, district of Himachal Pradesh; India. The plant was identified at Plant Anatomy Research Center, West Tambaram, Chennai (PARC/2009/478).

ANTIBACTERIAL ACTIVITY[8,9]:

Preparation of culture media:[10]

Mueller Hinton Agar:

Beef, Infusion Form	-	300 gm
Casein Acid Hydrolysate	-	17.50 gm
Starch	-	1.50 gm
Agar	-	17.00 gm
Distilled water	-	q.s.to make 1000 ml

Beef extract, Casein acid Hydrolysate, starch and agar were mixed with 800 ml of distilled water and digested for an hour on water bath. The pH was adjusted to 7.4. Volume was adjusted to 1000 ml with distilled water. It was then again digested on autoclaving at 121^0C, 15 lbs pressure for 20 minutes, cooled and stored in a refrigerator for over night.

Preparation of standard discs:

Commercially available standard discs (Hi Media Company) were taken as a standard drug.

Preparation of sample:

From stock solution of test extracts different concentration were prepared for performing antibacterial activity. The dilute extracts were stored in a sterile container and kept in a refrigerator.

Method of inoculation in solid media:

A platinum loop was well sterilized by keeping it vertically on a flame and it was made red hot and allowed to cool. The loop was touched with well-mixed specimens and rubbed on one side of dry media in little area (A). The loop was again sterilized and plate was rotated for 90^0. The loop was rubbed 3-4 times on media of previously inoculated side (A) and little part of non-inoculated media was (B). Again the plate was rotated and above process was repeated.

Screening of antibacterial activity[11,12]:

Cup plate method:

Micro- wells were made on culture media in 6 mm in diameter with the help of gel puncture machine. The micro- wells were filled with 100 µl from different concentration of ethanolic and aqueous extracts. Standard disc (Ciprofloxacin) was also impregnated on the medium. The Petri dishes used for antibacterial screening were incubated at 37^0 C for 24-48 hours. The activity was measured in terms of diameter of zone of inhibition appearing around the micro -wells.

Results of screening of antibacterial activity with different extracts of P*runus armeniaca* (L.) are given in the Table No.1.

Table 1: Antibacterial effect of various extracts of fruits of p*runus armeniaca* (l.) on various pathogenic microorganisms

Microorganisms	ZONE OF INHIBITION (mm)						
	Ethanolic Extract 4mg/ml	Aqueous Extract 4mg/ml	Ethanolic Extract 2mg/ml	Aqueous Extract 2mg/ml	Ethanolic Extract 1mg/ml	Aqueous Extract 1mg/ml	Standard Drug (Ciprofloxacin 30 µg/Disc)
Escherichia coli	20	18	12	12	00	00	30
Staphylococcus aureus	27	22	30	24	40	27	15
Proteus vulgaris	30	21	16	06	06	00	28
Bacillus subtilis	44	40	30	18	22	16	30

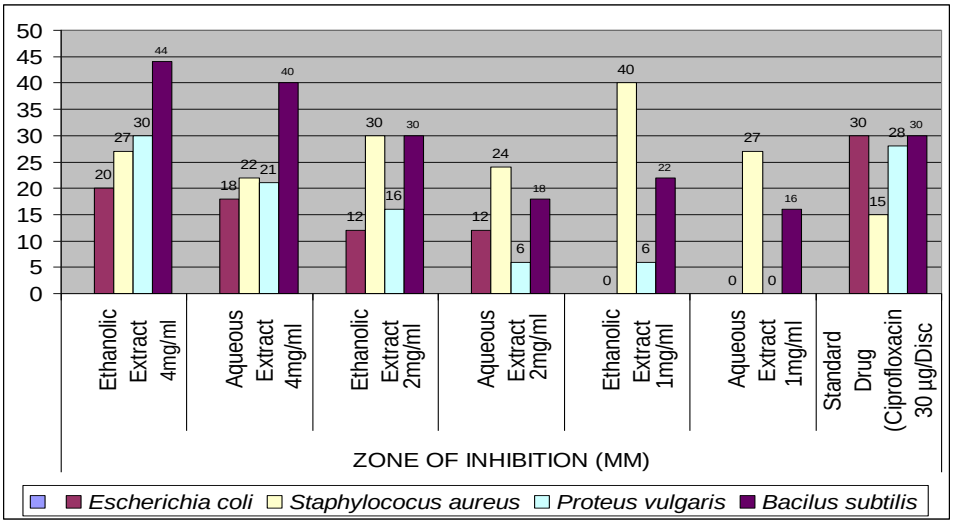

Figure 1: Graphical representation of antibacterial activity of various extracts of fruits of *Prunus armeniaca* (l.)

ANTIFUNGAL ACTIVITY:

Preparation of culture media:[10]

Sabouraud's dextrose broth:

Dextrose	-	4.0 gm
Peptone	-	1.0 gm
Agar	-	1.50 gm
Chloramphenicol	-	5.0 mg
Distilled water	-	q.s.to make 1000 ml

Dextrose, peptone, agar and Chloramphenicol were mixed with 800 ml of distilled water and digested for an hour on water bath. The pH was adjusted to 5.4-5.8. Volume was adjusted to 1000 ml with distilled water. It was then again digested on autoclaving at 121^0C, 15 lbs pressure for 20 minutes, cooled and stored in a refrigerator for 3-5 days.

Preparation of standard discs:

Commercially available standard discs (Hi Media Company) were taken as a standard drug.

Preparation of sample:

From stock solution of test extracts of concentration 200 µg/ml were prepared for performing antifungal activity. The dilute extracts were stored in a sterile container and kept in a refrigerator.

Method of inoculation in solid media:

A platinum loop was well sterilized by keeping it vertically on a flame and it was made red hot and allowed to cool. The loop was touched with well-mixed specimens and rubbed on one side of dry media in little area (A). The loop was again sterilized and plate was rotated for 90^0. The loop was rubbed 3-4 times on media of previously inoculated side (A) and part of non-inoculated media was (B). Again the plate was rotated and above process was repeated.

Screening of antifungal activity[11,12]:

Cup plate method[13,14]:

Micro- wells were made on culture media in 6 mm in diameter with the help of gel puncture machine. The micro- wells were filled with 100 µl by 200µg/ml of ethanolic and aqueous extracts. Standards disc (Amphotericin B 50 µg/disc) was also impregnated on the medium. The Petri dishes used for antifungal screening were incubated at 37^0C for 24-48 hours. The activity was measured in terms of diameter of zone of inhibition appearing around the micro -wells.

Results of screening of antifungal activity with different extracts of P*runus armeniaca* (L.) are given in the Table No. 2.

Table 2: Antifungal effects of various extracts of fruits of *Prunus armeniaca* (L.) on various pathogenic microorganisms

Micro-organisms	Zone of Inhibition (mm)		
	Ethanolic Extract 200 µg/ml	Aqueous Extract 200 µg/ml	Standard Drug (Amphotericin B) 50 µg/Disc
Candida albicans 32354 - B311	08	00	10
Aspergillus niger 38857 (IFO4407)	00	00	12

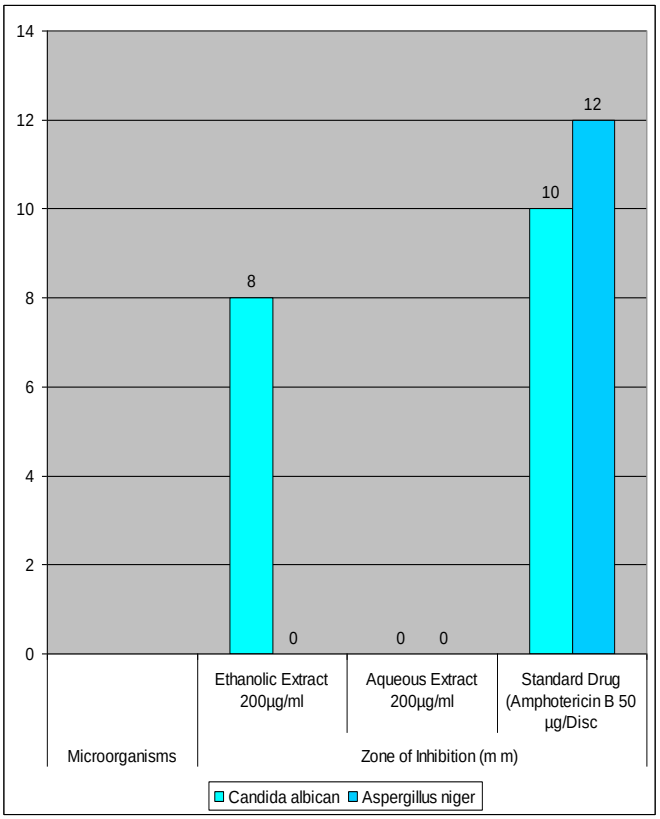

Figure 2: Graphical representation of antifungal activity of various extracts of fruits of *Prunus armeniaca (l.)*

RESULTS AND DISCUSSION

Antibacterial activity of ethanolic and aqueous extracts of P*runus armeniaca* (L.), were investigated.

Ethanolic and aqueous extracts of P*runus armeniaca* (L.) showed the antibacterial activity against *Escherichia coli, Staphylococcus aureus, Proteus vulgaris and Bacillus subtilis.*

For *Escherichia coli*: Ethanolic extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 20mm, 12mm, 00 mm respectively. Aqueous extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 18, 12, 00 (mm) respectively as compared to standard drug (Ciprofloxacin 30 µg/disc) 30mm.

For *Staphylococcus aureus*: Ethanolic extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 27, 30, 40(mm) respectively. Aqueous extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 22, 24, 27 (mm) respectively as compared to standard drug (Ciprofloxacin 30 µg/disc) 15 mm.

For *Proteus vulgaris*: Ethanolic extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 30mm, 16mm, 06 mm respectively. Aqueous extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 21, 06, 00 (mm) respectively as compared to standard drug (Ciprofloxacin 30 µg/disc) 28 mm.

For *Bacillus subtilis*: Ethanolic extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 44mm, 30mm, 22 mm respectively. Aqueous extract at different concentrations (400, 200 and 100 µg/ml) showed the zone of inhibition 40, 18, 16(mm) respectively as compared to standard drug (Ciprofloxacin 30 µg/disc) 30 mm.

Antifungal Activity:

Antifungal activity of ethanolic and aqueous extracts of P*runus armeniaca* (L.), were investigated.

For *Candida albican*: Ethanolic extract at concentration (200 µg/ml) showed the zone of inhibition 08mm. Aqueous extract at concentration (200 µg/ml) showed the zone of inhibition 00mm as compared to standard drug (Amphotericin B 50 µg/disc) 10 mm.

For *Aspergillus niger*: Both ethanolic and aqueous extracts at concentration (200 µg/ml) showed no antifungal activity. Only ethanolic extract of P*runus armeniaca* (L.) showed the antifungal activity against *Candida albican*.

CONCLUSION

The antibacterial studies on both ethanolic and aqueous extracts (400µg/ml) showed significant antibacterial activity against *Staphylococcus aureus, Bacillus subtilis* and *Proteus vulgaris* as compared to standard drug (Ciprofloxacin 30 µg/disc). Ethanolic extract showed more significant antibacterial activity as compared to aqueous extract.

The antifungal studies on ethanolic extract (200µg/ml) of the fruit showed significant effect against *Candida albican* as compared to standard drug (Amphotericin B 50 µg/disc). Ethanolic extract showed significant antifungal activity where as aqueous extract showed no activity.

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