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Antibacterial activity of some higher plant floral petals

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ABSTRACT

In the present study, an antimicrobial activity of some higher plant floral petal extracts were tested against the gram positive and gram negative bacterial strains, *Bacillus subtilis, Bacillus megatherium, Staphylococcus aureus, Escherichia coli* and *Proteus vulgaris* respectively. The floral petal extracts showed different degree of inhibition zones against tested microorganism. Off 14 plants floral extracts only 9 plants petals exhibited antibacterial activity against tested micaroorganisms. Among nine only four plants extracts *viz. Nerium indicum, Celosia cristata, Cocinia indica* and *Cucurbita maxima* showed higher antibacterial activity.

KEYWORDS

Higher plants;
Floral petals;
Antibacterial activity.

INTRODUCTION

Medicinal plants research has increased all over the world. Medicinal plants used in the various traditional systems in now a days. Variety of plants and their compounds shows with specific antimicrobial activity and antibiotic potential. The petals of the flowers are variously shaped, colored and aroma to attract the pollinating insects. They enclose the androecium and gynoecium and facilitate pollination. The petal tissues, some or all of these may possess antibacterial activity[1]. Several studies reveal the presence of compounds with antimicrobial properties in various plant parts[2-7]. The biotic substances in plants are produced as secondary metabolites[8], which may not only be developmental stage specific, but also organ and tissue specific. While various information on antimicrobial activity of plant flowers and especially petals were scanty. The flower petals which provide physical protection to the reproductive components can be expected to synthesize potent bioactive compounds. Interestingly the symptoms of most plant disease of bacterial or fungal origin have been reported mostly on the leaves, stem, roots, and seldom on petals[9]. Hence the antimicrobial activity of some higher plant flower petals has been investigated in the present study.

MATERIALS AND METHODS

Collection of floral petals and preparation of extracts

The various higher plants flower petals were collected from the local area and the petals were first surface sterilized with 0.1% $HgCl_2$ for 10 seconds and

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washed with sterile distilled water for three successive times. Sterilized petals were crushed in mortar and pestle and aqueous extracts were prepared with sterile distilled water and filtered through a milli pore filter.

Bacterial strains

Antibacterial activity of crude extracts of plant floral extracts were tested against the gram positive bacteria *Bacillus subtilis, Bacillus megaterium, Staphylococcus aureus* and gram negative strains of *Escherichia coli, Proteus vulgaris* respectively. The bacterial cultures were obtained from IMTECH, Chandigarh, India. After activation, the young bacterial cultures were inoculated in nutrient agar medium.

Antibacterial activity

Antibacterial activity of plant floral was determined by agar well diffusion method[9]. Nutrient agar plates were prepared by pour plate method. To the molten sterile nutrient agar medium (40-45^{0}C) 0.1ml growth culture of concerned test organism was mixed thoroughly and poured into sterile flat bottomed Petri dish (6.0 cm diameter) and allowed to solidify. Wells of 6mm size were made with sterile cork borer and 100µl of floral petal filtrate was poured into previously made wells and plates were incubated for 24 hours in an incubator at 37^{0}C. After incubation the plates were observed for formation of inhibition zones. The diameter of inhibition zones was measured. The medium containing antibiotic streptomycin at a concentration of 10µg/ml was used as control.

RESULTS AND DISCUSSION

The antibacterial activity of crude aqueous extract of petals from various plants were tested against both gram positive and gram netagive bacterial strains such as *Bacillus subtilis, Bacillus megatherium, Staphylococcus aureus, Escherichia coli* and *Proteus vulgaris* and the results shown in TABLE 1. Off 14 plants tested in this study, 9 plants floral extracts exhibited antibacterial activity against bacterial strains tested expect *Proteus vulgaris* (TABLE 1).

Among nine species, only four plants, *Nerium indicum, Celosia cristata, Coccinia indica* and *Cucurbita maxima* shown to be broad range of activity,

TABLE 1 : Antibacterial activity of higher plant floral petal extracts.

Name of the plant	Zone of inhibition in millimeter (mm)				
	Bacillus subtilis	Bacillus magaterium	Staphylococcus aureus	E.coli	Proteus vulgaris
Azadiractha indica	-	-	-	-	-
Catharanthus roseus	5	2	2	-	-
Celosia cristata	8	-	-	-	-
Cestrum nocturnum	-	-	-	-	-
Coccinia indica	-	-	7	1	-
Cucurbita maxima	6	-	3	3	-
Datura stramonium	4	5	4	-	-
Hamelia patens	-	-	-	3	-
Ixora arboria	-	4	3	1	-
Lochnera rosea	-	-	-	-	-
Nerium indicum	2	-	10	-	-
Ocimum sanctum	-	-	2	3	-
Tabernaemontana coronaria	-	-	-	-	-
Tridax procumbence	-	-	-	-	-
Streptomycin antibiotic (Control)	10	14	12	12	11

Note: - Indicates without inhibition zone

where as five plant petal extracts did not exhibit any antibacterial activity against bacterial strains (TABLE 1). For instance, the petal extract of *Nerium indicum* exhibited maximum inhibition zone on *Staphylococcus aureus* (10 mm) which is very nearer to the activity of streptomycin (12 mm) which acts as control. *Celosia cristata, Coccinia indica* and *Datura stramonium* were exhibited maximum antibacterial activity than other plant floral extracts (TABLE 1). Similar studies were made by other authors on antimicrobial activity on different plants, *Alium sativa*[4], *Citrus lemon*[10], *Emblica officinalis*[11], *Heliotropium indicum*[12], *Betula pendula*[13]. According to studies of Daroker et al[14] the petals of twenty six out of 110 varieties of rose showed detectable antibacterial activities against one or more of the five gram positive and six gram negative bacterial strains . Antonelli et al[15] also reported that extracts of rose petals confirms the antibacterial in the ethno-botanical evidences on the use of petals of different types to cure diarrhea and enlarged tonsils. Hirulkar et al[16] reported that the petroleum ether and alcoholic extracts of rose petals were evidences for the antimicrobial activity against the pathogenic bacteria. Similarly the plant floral extract *Plumeria alba* appears to have significant antimicrobial capacity resembling a

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broad spectrum antibiotic against the common urogastro pathogenic *Escherichia coli*, one of the common bacteria with pathogenic strains and are relatively resistant towards synthetic drugs[17]. Sharad et al[18] studied the antibacterial activity of different plant parts such as Root, stem, leaf and flowers extracts of *Dahlia pinnata*, the antibacterial activity of both fresh and dried plant parts against *E.coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Enterobacter aerogenes* and *Agrobacterium tumefaciens*. The plant leaves *Dahlia pinnata* possessed highest antibacterial activity against the bacterial strain *Enterobacter aerogenes.*

CONCLUSION

The present study reveals that the floral petals of many angiosperms higher plant species posses' significant antibacterial activity against bacterial strains which cause the diseases in human beings. The study opens up the area for further detailed characterization and screening of higher plants. The rapidity of this screening procedure by direct testing to identify the petals of specific plant species as sources of new antibiotics and drugs.

REFERENCES

[1] W.Fabry, P.O.Okemo, R.Ansorg; J.Ethnopharmacol., **60**, 79-84 **(1998)**.

[2] M.Ieven, D.Vanden Berghe, F.Mertens, A.Viletinck, E.Lammens; Plant Media, **36**, 311-321 **(1979)**.

[3] B.S.Aswal, D.S.Bhakuni, A.K.Goel, K.Kar, B.N.Mehrotra; Indian J.Exp.Biol., **22**, 487-504 **(1984)**.

[4] T.H.Lovelli; Indian J.of Medi.Microbial., **(1993)**.

[5] P.M.Tumane, B.J.Wadher, Khan Aqueel, A.V.Gomashe, A.B.Ingle; J.Microrb.World, **2(2)**, 47-55 **(2000)**.

[6] D.Karuppuswamy, K.M.Rajasekharan, N.Karmeghan; J.of Ecotoxicol and Environ.Moni., **12**, 67-68 **(2002)**.

[7] K.Shanmuga Priya, A.Gnanamani, N.Radha Krishanan, Mary Babu; Indian Drugs, **39**, 113-116 **(2002)**.

[8] D.H.Williams, M.Stone, P.R.Houck, S.K.Rahman; J.Nat.Prod., **52**, 1189-1208 **(1989)**.

[9] C.Perez, M.Pauli, P.Bazerque; Acta Biologia et Medicine Experimentalis, **15**, 113-115 **(1990)**.

[10] B.S.Nagoba, R.C.Gandhi, B.J.Wadher, S.R.Deshmukh, S.P.Gandhi; Citric Acid Treatment of a Severe Electric Burn Complicated by Multiple Antibiotic Resistant *Pseudomonas aeruginosa* Case Report "BURNS" (London), **24(5)**, 481-483 **(1998)**.

[11] B.K.Mehta, S.R.Shitut, Wankhadeh; In *in vitro* Antimicrobial Efficacy of Triphala Fitoterapia, **14(4)**, **(1993)**.

[12] P.R.Rao, S.Nammi, A.D.V.Raju; J.Natural Remedies, **2(2)**, 195-198 **(2002)**.

[13] H.M.Mukhtar, S.H.Ansari, M.Ali, F.A.Wani; Hamdard Medicus V, **45(1)**, 41-43 **(2002)**.

[14] M.P.Darokar, A.Mathur, S.Dwivedi, R.Bhalla, S.P.S.Khanuja, S.Kumar; Curr.Sci., **75**, 187-189 **(1998)**.

[15] A.Antonelli, C.Fabbri, M.E.Giorgioni, R.Bazzocchi; J.Agric.Food Chem., **45**, 4435-4439 **(1997)**.

[16] N.B.Hirulkar, Mona Agrawal; International Journal of Pharmaceutical and Biological Archives, **1(5)**, 478-484 **(2010)**.

[17] M.H.Syakira, L.Brenda; World Academy of Science, Engineering and Technology, **68**, 1463-1466 **(2010)**.

[18] B.Sharad Bissa, Avinash Bohra, A.Bohra; Journal of research in Biology, **1**, 51-55 **(2011)**.