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SHORT COMMUNICATION

Plant extract as antimicrobial agent

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Several plants have been evaluated for possible Antimicrobial activity and to get remedy from a variety of ailment of microbial origin. Certain plants contain products such as alkaloids, tannins, quinons, essential oil phenol compound and mercuric compound in their extracts. These compounds are known for their antimicrobial activity. In the present study plant extract of various wild species were used as antimicrobial agent. Impregnated discs of the above wild species were prepared using concentrated leaf extract. These discs were used as antibiotic agent against different bacterial species.

For testing the antimicrobial activity of plant extract against different bacterial isolates, the aqueous extract was prepared. Plants in use were mostly herbs and trees. These plants include- *Azadiracta indica*, *Chenopodium album*, *Phyllanthus* sp., *Ocimum sanctum*, *Lantana camara*, *Aloe vera*, *Parthenium hysterrophorus*, *Catharanthus roseus*, *Eucalyptus* sp.

Impregnated discs of these plant extracts were used for testing the antimicrobial activity. Prepared antimicrobial discs were aseptically placed on nutrient dextrose agar seeded with the test organisms. Plates were incubated at ± 27°C temperature for 24-48 hours. A zone of inhibition around the discs was recorded as positive test for sensitivity (Schaad, 1988).Mean colony diameter in mm. was recorded after 24 and 48 hours of incubation.

The zone of inhibition (in mm.) were recorded after 24 and 48 hours and sensitivity of various plant extract on different bacterial isolates are presented in Table 1and 2. The result indicated that leaf extract of plant species differed significantly in their effectiveness. Bacterial isolates were more sensitive to plant extract of *Azadiracta indica*, *chenopodium album* and *Phyllanthus* sp. than other plant leaf extracts. *Azadirecta indica* was most effective against *Bacillus* sp.4 and *Bacillus* sp.5. The zone of inhibition produced by these isolates was 10mm.The zone of inhibition of other bacterial species varied from 5 mm. to 9 mm. *Chenopodium album* was more effective against *Erwinia* sp. The zone of inhibition produced by these isolates was 9.5 mm. The zone of inhibition of other bacterial isolates varied from 4 mm. to 9 mm. *Phyllanthus* sp. was very effective against *Erwinia* sp.3. The zone of inhibition produced by this isolate was 10 mm. The zone of inhibition produced by other bacterial isolates varied. from 4 mm. to 9 mm. In camparison to *Azadiracta indica*, *Chenopodium album* and *Phyllanthus* sp. all bacterial isolates were less sensitive to *Ocimum sanctum*, *Parthenium hysterrophorus*, *Lantana camara* and *Catharanthus roseus*. However *Xanthomonas* sp.1 and *Xanthomonas* sp.2 were very sensitive to plant extract of *Ocimum sanctum*. The zone of inhibition produced by these isolates was 9 mm.

Singh and Dwivedi(1990) reported fungicidal properties of Neem (*Azadiracta indica*) against Sclerotium *rolfsii*. Khilare *et al* (2002) reported that the plant extract of *Azadirecta indica*, *Adhathoda vasica*, *ocimum sanctum* and *Phyllanthus emblica* were highly effective against *Alternaria tenius* causing fruit rot of grapes. Kadam (1997) reported that extract of *Ocimum sanctum*, *Azadiracta indica*, *Terminalia chebula* and *Catharanthus roseus* were highly effective against fruit rot caused by *Alternaria alternate*. The extract of *Ocimum sanctum*, *Azadiracta indica*, *Vitex negundo*, *Eucalyptus globules*, *Vinca rosea* and *Aloe vera* were effective against microbes *Gliocladium roseum* and *Bacillus* sp. (Devkate 1998).

Parthenium hysterrophorus was more effective against *Planococcus* sp.1. The zone of inhibition was 9 mm. The zone of inhibition produced by other isolates varied from 3 mm. to 8 mm. All bacterial isolates were less sensitive to leaf extracts of *Lantana camara* and *Catharanthus roseus* but these plant extracts were effective against *Planococcus* sp.3 *Planococcus* sp.4. Their zone of inhibition was 8 mm. and 7.5 mm. in both case. All bacterial species were completely resistant for leaf extract of *Aloe vera* and *Eucalyptus* sp. No zone of inhibition was formed in them.

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Table 1. Effect of plant extract on different bacterial species

S. No.	Bacterial Species	*Azadirachta indica*		*Chenopodium album*		*Phyllanthus Sp.*		*Ocimum sanctum*		*Parthenium hysterrophorus*		*Lantana camara*		*Catharanthus roseus*	
		Zone of Inhibition (in mm.) after													
		24 h.	48 h.	24 h.	48 h.	24 h.	48 h.	24 h.	48 h.	24 h.	48 h.	24 h.	48 h.	24 h.	48 h.
1.	*Bacillus* sp. 1.	7	7.5	8	8	7	7	6	6.5	5	5.5	5	5	4.5	4.5
2.	*Bacillus* sp. 2.	7	7.5	8	8	7	7	6	6.5	5	5.5	5	5	4.5	4.5
3.	Bacillus sp. 3.	7	8	8	9	7	7.5	6	6	5	5	4	4.5	4	4
4.	*Bacillus* sp. 4.	10	10	8	8	7	7	6.5	6.5	3	3	6	6	5	5
5.	*Bacillus* sp. 5.	10	10	8	8	7	7	6.5	6.5	3	3	6	6	5	5
6.	*Erwinia* sp. 1.	6	6	7	7	6.5	6.5	4	4.5	4	4	5.5	5.5	5	5
7.	*Erwinia* sp.-2.	7	7.5	9	9.5	5	6	5	5	3.5	3.5	4.5	4.5	4	4
8.	*Erwinia* sp. 3.	7	7	8.5	8.5	10	10	5	5	4	4	4	4.5	6	6.5
9.	*Micrococcus* sp.1.	8	8.5	8	8.5	8	8.5	4.5	5	5.5	5.5	6	6	3.5	4
10	*Micrococcus* sp.2.	8	8.5	8	8.5	8	8.5	4.5	5	5.5	5.5	6	6	3.5	4
11.	*Planococcus* sp. 1.	6	6	5	5	5	5.5	6	6	8	9	7	7	6	6
12.	*Planococcus* sp. 2.	6	6	5	5	5	5.5	6	6	8	8	7	7	6	6
13.	*Planococcus* sp. 3.	7	7	5	6	4	4	3	3	8	8	8	8	8	8
14.	*Planococcus* sp. 4.	7	7	5	6	4	4	3	3	7.5	7.5	7.5	7.5	7.5	7.5
15.	*Planococcus* sp. 5.	5	5	5	5	5	5	4	4	6	6	5	5	7	7
16.	*Planococcus* sp. 6.	5	5	5	5	5	5	3	4	6	6	5	5	6	7
17.	*Pseudomonas* sp.1.	6	6.5	6	6	4	5	3	4	2	3	6	6.5	6	6.5
18.	*Pseudomonas* sp.2.	5	5.5	4	4	4.5	5	4	4.5	3	3	5	6	5.5	6
19.	*Xanthomonas* sp.1.	9	9	9	9	9	9	9	9	5	6	4	5	4	4
20.	*Xanthomonas* sp.2.	9	9	9	9	9	9	9	9	5	6	4	4	5	5.5

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Table 2. Sensitivity of various plant extract on different bacterial species

S. No.	Bacterial Species	Sensitivity to plant extract
1.	*Bacillus* sp. 1.	Ch > Az > Ph > Oc > Pa > La > Ca
2	*Bacillus* sp. 2.	Ch > Az > Ph > Oc > Pa > La > Ca
3	*Bacillus* sp. 3.	Ch > Az > Ph > Oc > Pa > La > Ca
4	*Bacillus* sp. 4.	Az > Ch > Ph > Oc > La > Ca > Pa
5	*Bacillus* sp. 5.	Az > Ch > Ph > Oc > La > Ca > Pa
6	*Erwinia* sp. 1.	Ch > Ph > Az > La > Ca > Oc > Pa
7	*Erwinia* sp. 2.	Ch > Az > Ph > Oc > La > Ca > Pa
8	*Erwinia* sp. 3.	Ph > Ch > Az > Ca > Oc > La > Pa
9	*Micrococcus* sp.1.	Az = Ch = Ph > La > Pa > Oc > Ca
10	*Micrococcus* sp.2.	Az = Ch = Ph > La > Pa > Oc > Ca
11	*Planococcus* sp. 1.	Pa > La > Oc = Ca = Az > Ph > Ch
12	*Planococcus* sp. 2.	Pa > La > Oc = Ca = Az > Ph > Ch
13	*Planococcus* sp. 3.	La = Ca = Pa > Az > Ch > Ph > Oc
14	*Planococcus* sp. 4.	La = Ca = Pa > Az > Ch > Ph > Oc
15	*Planococcus* sp. 5.	Ca > Pa > La = Ph = Ch = Az > Oc
16	*Planococcus* sp. 6.	Ca > Pa > La = Ph = Ch = Az > Oc
17	*Pseudomonas* sp.1.	Az = Ca = La > Ch > Ph > Oc > Pa
18	*Pseudomonas* sp.2.	Ca = La > Az > Ph > Oc >Ch > Pa
19	*Xanthomonas* sp.1.	Az = Ch =Ph =Oc > Pa > La > Ca
20	*Xanthomonas* sp.2.	Az = Ch =Ph =Oc > Pa > Ca > La

Az = *Azadiracta indica*
Ch= *Chenopodium album*
Ph= *Phyllanthus* sp.
Oc *Ocimum sanctum*
La = *Lantana camara*
Pa =*Parthenium hysterrophorus*
Ca =*Catharanthus roseus*

Dhaliwa *et al* (2002) found that essential oils viz. *Eucalyptus camaldulesis*, *Parthenium hysterrophorus*, *Mentha piperita*, *Cleodendron inerme* prepared from different plants by steam distillation process were effective against Mandarin fruit rot caused by *Penicillium digitatum*. Pawar, 2005 reported that *Aloe vera* leaf extract was highly effective against *Staphylococcus aureus*. Similar analysis of antimycobacterial activity of *Aloe vera* L. and *Adhathoda vasica* Nees were conducted by Gupta *et al* (2006). Allelopethic effect of *Lantana camara* extracts on spore germination of *Riccia billardieri* Mont et Nees tested by Chaudhary *et al* (2007).

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