Short Communication

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ANTIMICROBIAL ACTIVITY IN EIGHT SPECIES OF *JATROPHA* L. (EUPHORBIACEAE)

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Eight taxa of *Jatropha* L. were screened for their fungitoxicity and *Escherichia coli, Proteus vulgaris* and *Bacillus polymyxa,* for their antibacterial activity. Leaf, stem and roots of *J. gossiypiifolia,* leaves of *J. multifida,* seeds and callus of *J. glandulifera* only showed over 50% inhibition of spore germination of *Fusarium oxysporum.* Callus of *J. glandulifera* and *J. gossiypiifolia* showed over 70% inhibition of spore germination to *Curvularia lunata,* while the roots of *J. podagrica, J. integerrima* and seeds of *J. glandulifera* showed partial response against *Fusarium oxysporum* and *Curvularia lunata, J. curcas* and *J. tanjorensis* (leaves) were devoid of fungicidal principle. Roots of *J. glandulifera* only showed antibacterial activity against *Escherichia coli, Bacillus subtilis* and *B. polymyxa.*

Key Words : Antifungal, antibacterial, *Jatropha,* leaves, stem, root, callus, aqueous extracts.

There is a growing trend to use crude extracts of some plants for their promising antimicrobial activity (Ward *et al.,* 1975 and Pravindra Chary *et al.,* 1984). Various solvent extracts of plants have been shown to be antibacterial (Ward *et al.,* 1975). In view of increasing health hazards of microbial, pollution, use of fungicides and pesticides intensive search for new and safe therapeutics has been advocated. Survey of literature on folklore aspects of *Jatropha* species shows that preparations of various plant parts are used in treatment of various diseases like leprosy, venereal diseases, ulcers, dermatitis, snake bite and even cancer (Chopra *et al.,* 1986 and Kupchan *et al.,* 1976). In view of the great importance, this investigation was undertaken and eight species of *Jatropha* both wild and cultivated were screened against four bacteria and two phytopathogenic fungi.

Effect of extracts of eight taxa of *Jatropha* L. (Euphorbiaceae) on spore germination of two seed borne fungi viz., *Fusarium oxysporum* and *Curvularia lunata,* isolated from grains of *Oryza sativa* was assayed. 15-12 day Callus cultures of various species were used. Callus was raised following the procedure of Reddy *et al.* (1986). 5 gms. of tissue of different parts of plant (Table -1) was homogenized with 5 ml of distilled water in a tissue homogenizer and filtered through fine mulsin cloth. The filterate was centrifuged at 1800 x g for 10 min. To the supernatant of the extract, spore suspension was added. Spore suspension of these fungi was prepared in aqueous extracts from 7 days old cultures grown on Asthana and Hawker's medium "A" so as to get 20-30 sporea per microscopic field (10 x 40). Glass slide humid chamber technique (Anonymous, 1947) was employed. At the end of 8 hous, spore germination was recorded in 10 randomly selected microscopic fields and the percentage of spore germination inhibition was calculated using the formula:

$$\text{\% of inhibition} = 100 - \frac{\text{No. of spores germinated in treatment}}{\text{No. of spores germinated in control}} \times 100$$

From this, percentage of spore germination inhibition was calculated.

Antibacterial activity of *Jatropha* extracts was assayed following Vincent and Vincent (1944). The paper discs dipped in plant extracts were implanted on bacterial seeded nutrient agar plates and incubated at 37°C for 72 hours. Paper discs treated in a similar way without *Jatropha* extracts served as control. *Escherichia coli, Proteus vulgaris, Bacillus subtilis* and *Bacillus polymyxa* were employed for assaying antibacterial activity.

Eight species of *Jatropha* were screened for their antifungal activity against two pathogenic fungi (*Fusarium oxysporum* and *Curvularia lunata*) and the results are presented in Table 1.

From the data it is obvious that *Jatropha* species varied in their fungitoxicity. Leaf, stem and roots of *J. gossypiifolia* Var. *elegans* and *J. tanjorensis,* leaves of *J. mutifida,* seeds of *J. integerrima* only showed more than 50% inhibition of spore germination of *Fusarium oxysporum.* Callus of *J. glandulifera* showed more than 70% inhibition of spore germination of *Fusarium oxysporum* and *Curvularia lunata.* Seeds of

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Table 1 Antifungal activity of *Jatropha* species (% of spore germination inhibition)

Sl. No.	Name of the plant	Fusarium oxysporum					Curvularia lunata				
		Leaf	Stem	Root	Seed	Callus	Leaf	Stem	Root	Seed	Callus
1.	*J. gossypiifolia* var. *elegans*	56.3	54.2	49.84	1.2	3.35	–	–	–	–	36.33
2.	*J. gossypiifolia* var. *gossypiifolia*	45.0	15.0	–	–	–	10.00	–	–	–	–
3.	*J. podagrica*	–	5.9	46.65	2.6	–	2.96	3.25	4.96	–	–
4.	*J. glandulifera*	21.0	–	–	62.3	72.74	1.50	–	–	51.94	75.98
5.	*J. integerrima*	–	10.4	44.94	90.40	–	–	0.39	2.51	80.00	–
6.	*J. curcas*	39.4	27.9	12.19	–	–	–	–	–	–	–
7.	*J. multifida*	61.23	30.6	4.5	21.8	–	–	–	–	47.75	–
8.	*J. tanjorensis*	84.00	83.00	78.50	x	–	15.00	–	2.50	x	–

Key : – = No inhibition x = Seed not available

J. glandulifera and *J. integerrima* showed more than 50% inhibition of spore germination of *Curvularia lunata*, while the roots of *J. podagrica* and *J. integerrima* showed partial inhibition of *F. oxysporum* and *C. lunata*.

Roots of *J. glandulifera* showed promising antibacterial activity against *E. coli, B. subtilis* and *B. polymyxa* as judged by bacterial growth inhibition zone. Callus of *J. curcas* restricted the growth of *P. vulgaris* to some extent. Leaf of *J. curcas* also showed some degree of antibacterial activity against *B. polymyxa*, while callus of other species investigated were devoid of antibacterial principle. Leaves and seeds of all species likewise were devoid of antibacterial activity.

Kumar *et al* (1979) in their study of antifungal activity of 51 plant species of which four species belong to Euphorbiaceae including fruit extracts of *Jatropha podagrica* noted spore germination inhibition of *Drechslera rostrata* (12.6%), *Fusarium oxysporum* (34.0%), *Alternaria alternata* (15.4%) and *Corynespora casiicola* (11.7%). Pravindra Chary *et al* (1984) studied the effect of extracts *Jatropha gossypiifolia* Var. *elegans* and *J. curcas* on *Curvularia lunata* and *Alternaria alternata* and reported that stem extract of *J. gossypiifolia* Var. *elegans* has no inhibitory effect, whereas *J. curcas* leaf extract showed 59.6%, 18.1% inhibition of *Alternaria alternata* and *Curvularia lunata* respectively.

Recent chemical and biological investigations of *J. gossypiifolia* have indicated that a novel macrocyclic diterpencid and "Jatrophone" displayed inhibitory activity *in vitro* against four animal tumor systems and shown to be significantly effective against lymphocytic leukaemia (Kupchan, 1976). Jatrophone is currently being considered as a candidate for Phase-I human testing on cancer patients (Kupchan, 1976). It is interesting to note that saline and other extracts of *J. gossypiifolia* shoots show antibiotic property against *E. coli*, while the latex shows antilepromatic properties (Chopra *et al*, 1986). In view of the vast potential further work on *Jatropha* species is desirable.

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