

## EVALUATION OF MEDICINAL PLANT EXTRACTS AGAINST BANANA ROT

H.N.P. SINGH, M.M. PRASAD AND K.K. SINHA

University Department of Botany, Bhagalpur University, Bhagalpur - 812 007, India  
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The aqueous extracts of some medicinal plants viz. *Calotropis procera* R. Br., *Vitex negundo* Linn., *Lantana camara* Linn., *Azadirachta indica* Linn., *Ficus religiosa* Linn., *Ocimum sanctum* Linn., *Thuja orientalis* Linn., *Argemone mexicana* Linn., *Achyranthes aspera* Linn., *Datura fastuosa* Linn., *Ricinus communis* Linn., were tried on banana fruits (var. chinia) infested with *Botryodiplodia theobromae* Pat, *Fusarium oxysporum* Schl., *Helminthosporium spiciferum* (Bain) Nict., *Curvularia lunata* Wakker., *Aspergillus flavus* Link ex Fries and *Trichothecium roseum* Link. Leaf extracts of *A. indica*, *O. sanctum* and *R. communis* were found to be most effective in controlling the disease development where the percent loss in weight was also minimum. In treated fruits first visible disease symptom was too delayed as compared to untreated lots.

Banana is one of the most important fruit and vegetable crops of Bihar. It is extensively grown in diara areas of North Bihar and is also widely cultivated as backyard crop in households. But banana fruits are damaged considerably in field during transportation and in markets due to various fungi (Chakravarti *et al.*, 1977). The present study aims to minimize the microbial spoilage of banana by some medicinal plant extracts.

Leaf extracts of these plants were prepared following the method of Kumar and Sachan (1979). Aqueous extracts (2 : 10 w/v) of leaves were prepared in glass homogenizer separately. The homogenized solutions were filtered through muslin clothes and were centrifuged at 3000 rpm for 15 minutes. In order to study the effect of leaf extracts on disease development caused by different test fungi, the banana fruit of approximately equal size and the same physiological age were selected for the present experiment. The fruits were dipped into aqueous extracts of all the leaves and were kept in polyethy-

lene bags under laboratory conditions. In each case control was maintained. After 24 hours treated fruits were infested separately by the test fungi following the method of Granger and Horne (1924). The treated as well as untreated fruits were stored at room temperature for 10 days and observations were taken during first appearance of the disease symptom. The loss in weight was calculated at the end of the incubation period.

Table -1 elucidates that first symptom in untreated fruits of 'chinia' variety appeared on 4th day by *B. theobromae*, *F. oxysporum*, *H. spiciferum*, *C. lunata*, *A. flavus* and *T. roseum* in accordance the fruit showed 19.48, 20.34, 19.38, 21.13, 19.43 and 19.83 percent loss in weight. Treatment of infested lots by the leaf extracts of *A. indica*, *O. sanctum* and *R. communis* delayed appearance of symptom and was recorded on 8th day where loss in weight was also minimum. However, *A. indica*, *O. sanctum* and *R. communis* were found to be most effective in controlling the diseases of fruits (Gourinath and Manoharachary, 1984). The application of leaf extracts of *A. mexicana*, *C. procera* and *D. fastuosa* showed the moderate effect as compared to *A. indica*, *O. sanctum* and *R. communis* where loss in weight was minimum and appearance of first disease symptom was also delayed. Similarly extracts of *A. aspera*, *F. religiosa*, *L. camara* and *V. negundo* showed poor effect/result in controlling the fruit rot and the leaf extracts of *T. orientalis* had almost no effect in checking the disease development (Prasad, 1989).

Inhibitory effect of leaf extracts against test fungi under study may be attributed to the presence of antifungal compounds like terpenes, essential oils, phenols, certain alkaloids (Lantanadene and Lantamarene by leaves of *L. camara*), steroid like substance (azadirachtin, present in the leaves of *A. indica*) and resin (Arya, 1988; Kishore *et al.*, 1989).

Table 1: Effect of plant extracts on Spoilage of Banana fruits ('China' variety) under pathogenesis.

Leaf extracts	Concentration	<i>B. theobromae</i>		<i>F. oxysporum</i>		<i>H. spiciferum</i>		<i>C. lunata</i>		<i>A. flavus</i>		<i>T. roseum</i>	
		First symptom appeared	% loss in wt	First symptom appeared	% loss in wt	First symptom appeared	% loss in wt	First symptom appeared	% loss in wt	First symptom appeared	% loss in wt	First symptom appeared	% loss in wt
Control		4	19.48	4	20.34	4	19.38	4	21.13	4	19.43	4	19.83
<i>C. procera</i>	2:10 (W/V)	7	10.83	7	10.39	7	11.34	7	10.15	7	10.43	7	10.93
<i>V. negundo</i>	..	6	16.31		16.59	6	16.49	6	16.31	6	16.95	6	15.94
<i>L. camara</i>	..	6	16.36	6	15.31	6	16.01	6	15.21	6	15.01	6	15.13
<i>A. indica</i>	..	8	3.42	8	3.98	8	3.29	8	3.51	8	3.89	8	4.12
<i>F. religiosa</i>	..	6	4.31	6	14.38	6	16.05	6	14.18	6	14.59	6	1.04
<i>O. sanctum</i>	..	8	4.64	8	4.96	8	3.89	8	4.75	8	5.51	8	4.64
<i>T. orientalis</i>	..	5	18.36	5	18.41	5	17.59	5	18.63	5	18.14	5	17.95
<i>A. mexicana</i>	..	7	8.44	7	8.81	7	8.51	7	9.14	7	8.35	7	8.71
<i>A. aspera</i>	..	6	3.13	6	14.26	6	13.25	6	13.11	6	12.42	6	13.39
<i>D. fastuosa</i>	..	7	11.36	7	12.53	7	11.89	7	11.64	7	12.435	7	11.99
<i>R. communis</i>	..	8	5.91	8	6.75	8	6.51	8	6.71	8	6.43	8	5.97

Variance ratio

27.17\*

1.93

5% level of significance

1.92

2.37

1% level of significance

2.50

3.34

Significant at 1% level and 5% level of significance (Two way Analysis of Variance)

Mahadevan (1982) has also reported the plants containing prohibitants which are toxic to micro-organisms.

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## REFERENCES

- Arya A 1988 Control of Phomopsis fruit rots of grapes and guava. *Indian Phytopath.* 41(2) 214-219.
- Chakravarti N, N C Chattopadhyaya & B Nandi 1977 A new fruit disease of Singapuri variety of Banana *Curr Sci* 46 93.
- Gourinath A & C Manoharachary 1984 Effect of angiospermic leaf extracts on three pathogenic fungi. *Indian Bot. Repr.* 3(1) 95-97.
- Granger K & A S Home 1924 A method of inoculating the apples. *Ann Bot* 38 212.
- Kishore N, S N Dixit & N K Dubey 1989 Evaluation of leaves of some plants for their volatile fungitoxicity *J Indian Bot. Soc* 68(2,3,4) 167-168.
- Kumar Rajiv & S N Sachan 1979 Effect of some plant extracts on the conidial germination of *Curvularia pallescens* *Indian Phytopath.* 32(3) 489
- Mahadevan A 1982 "Biochemical Aspects of Plant Disease Resistance" Part - I. Today and Tomorrow Printers and Publishers, Delhi, pp. 110-164.
- Prasad M M 1989 Studies on diseases of Banana in Bihar and their control. Final Technical Report, U.G.C. code No. F. 23, 3-15/86 (SR-II).