Radiations and chemicals in the control of Diplodia stem-end rot of mango fruits

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DIPLODIA stem-end rot is one of the most serious diseases of ripe mango fruits in India (Pathak & Srivastava, 1967). Since epidemiological investigations on the disease revealed infection of the fruits while in the orchard (Pathak & Srivastava, 1967), attempts were made to evaluate various fungicides *in vitro*, which could later be tested as orchard sprays. Besides this, the possibility of curing infected fruits by radiations was also investigated.

Fungicides were tested *in vitro* at four concentrations, viz. 10,20,100 and 200 ppm. Measured quantities of the test fungicides were incorporated into melted sterilized potato dextrose agar media under aseptic conditions and the media poured into 10 cm. Petri dishes (20 ml per dish) which were inoculated with a 48-hour-old monoconidial culture of the pathogen. Controls were maintained on potato dextrose agar. Treatments were replicated five times. Colony diametres were measured after incubation for 3 and 15 days and the inhibition of growth calculated according to Vincent's formula (1947) from the average for each treatment, Table 1.

Table 1.—Percent inhibition of growth of D. natalensis by various fungicides at different concentrations

Fungicide	*Inhibition (%) at*							
	10 ppm after		*20 ppm after*		*100 ppm after*		*200 ppm after*	
	3 days	*15 days*	*3 days*	*15 days*	*3 days*	*15 days*	*3 days*	*15 days*
Dithane Z–78 ..	19..	12..	36..	18..	99..	56..	100..	89
Antracol ..	95..	86..	99..	89..	100..	100..	100..	100
Ferbam ..	9..	1..	23..	11..	26..	13..	67..	61
Dithane M–45 ..	0..	0..	19..	12..	99..	63..	100..	83
Blue Copper ..	0..	0..	0..	0..	0..	0..	27..	13
Ceresan ..	77..	53..	87..	83..	100..	100..	100..	100
Thiourea ..	0..	0..	0..	0..	0..	0..	0..	0
Miltox ..	12..	2..	13..	6..	27..	8..	31..	23
Cuman ..	0..	0..	58..	41..	69..	58..	89..	83
Control— ..	0..	0..	0..	0..	0..	0..	0..	0

Antracol and Ceresan were the most effective of the fungicides tested and inhibited growth of the fungus at concentrations of 100 ppm. Dithane Z-78, Cuman and Dithane M-45 were effective only at higher concentrations. Thiourea did not inhibit growth even at higher concentrations. Antracol and Ceresan should be investigated further to determine their suitability as orchard sprays.

Among the radiations, gamma rays (Cobalt-60, Gamma Cell, Division of Botany, Indian Agricultural Research Institute, Delhi-12) and ultra-voilet rays (Philips Germicidal Lamp, TUV-15W, transmitting 2537 A) were investigated. Their efficacy in curing the disease was studied by exposing the inoculated fruits (healthy fruits were surface sterilized and inoculated with a 48-hour old culture at stem-end) to radiations after 10 hours of incubation at 30 $\pm$ 1°C. Fruits in batches of five, were exposed to each of the three doses of gamma rays and ultra-violet rays, which were 2 x 10^5 2 x 7.5 x 10^5 and 4.5 x 10^5 rads for 5, 10 and 15 minutes respectively. Following iradiation treatments, fruits were held at 30 $\pm$ 1° C in sterilized desiccators along with control fruits, which were inoculated but not irradicated.

The influence of irradiations on growth of the pathogen was also studied. Petri dishes poured with potato dextrose agar were inoculated with a 48-hour-old culture of the incitant. These were irradiated with gamma and uv rays at the above mentioned doses after 10 hours of incubation at 30 $\pm$ 1° C and were held at this temperatue following irradiation. Inoculated Petri dishes without irradiation served as control. Inoculated fruits and Petri dishes following irradiation were observed daily after third day of treatment. The rate of decay of irradiated and unirradiated fruits was comparable and the same results were obtained regarding the rate of growth in irradiated and unirradiated Petri dishes. In this work with gamma rays, only the total doses and their effects were investigated. Further investigations on gamma flux as well as the total dose in curing this disease should be carried out. These studies have shown that the cure of infected fruits by radiation is not feasible. However, the fungicides Antracol and Ceresan strongly inhibited growth of the pathogen *in vitro* and their suitability as orchard sprays should be investigated.

REFERENCE

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