

PHYTOSANITARY SEED TREATMENTS IN OIL PALM *ELAEIS GUINEENSIS* J.

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ABSTRACT

The seeds of oil palm harbour several fungi on the mesocarp remnants. To prevent the spoilage of seeds by fungi and to check their spread to new areas (when germplasm introductions are made) the effects of methyl bromide fumigation and five fungicides were tried before preheating the seeds. The seed microflora, germination and seedling vigour were monitored. Methyl bromide fumigation reduced germination and had no effect on external microflora. Hence it cannot be recommended for seed treatment. Fungicide treatments increased seed germination and seedling vigour. Wet fungicide treatments with Emisan 6 (Methoxy Ethyl Mercury Chloride) 0.1% and Foltaf 80W (Captafol 80% WDP) 0.2% for 20 min. before preheating were effective in eliminating external microflora and helped in increasing seed germination and seedling vigour. Thus seed treatment with fungicides was the best for phytosanitary treatment of oil palm seeds.

INTRODUCTION

A total area of about 5000 ha has been brought under oil palm in Kerala and Andamans by introduction of seed materials/pollen from Africa and Malaysia. The expansion of oil palm cultivation warrants import of large number of seeds of promising lines from other oil palm growing countries. However utmost care should be taken to avoid introduction of pathogens / diseases especially vascular wilt (*Fusarium oxysporum* f. sp. *elaeidis*), freckle (*Cercospora elaeidis*), fatal yellowing and cadang-cadang (Turner, 1981).

As a precautionary measure for the oil palm seeds transported from Kerala, where spear rot (unknown etiology) prevails, to other states, seed treatment against microorganisms was felt necessary though it is not foolproof against all pathogens. Spoilage of seeds due to brown germ disease during storage also required treatment techniques. With the above objective a seed treatment experiment was carried out during 1987-88.

MATERIALS AND METHODS

A total of 1500 seeds were collected from 3 *dura* palms at Palode in 1987. The seed preparation was done by retting, smashing in sand mixture, cleaning and shade drying for one day. The seeds were stored in polythene bags of 600 gauge at room temperature for one month. The moisture content of the seeds were estimated by oven method. The external and internal microflora of the seeds were isolated, identified and estimated. The seeds were divided into 10 lots of 150 seeds each and the following treatments were given: Methyl bromide fumigation at room temperature : 16 gm/m³ for 12h, 24 gm/m³ for 12 h, 32 gm/m³ for 6 h and 40 gm/m³ for 6 h; Wet fungicide treatments for 20 min. in Emisan 6 (Methoxy Ethyl Mercury Chloride) 0.1% solution; Thiride 75 WDP 0.2%, Sten 50 0.2%, Foltaf 80W (Captan) 0.2%, Benlate 0.1% and control. The seeds treated with fungicides were dried in shade for 6 h, transferred to polythene bags of 600 gauge

and preheated in oven at a temperature of 40°C for 90 days. The post treatment microflora population was estimated. The moisture content of the seeds increased to about 21% by soaking in water for 5 days. After shade drying for 6 h the seeds were kept in moist polybags for germination. The germination count was recorded every week for five months. The viability of ungerminated seeds was ascertained by tetrasolium test. Sprouted seeds were planted in polythene bags of size 40 x 35 cm and the percentage of emergence was recorded. The height and number of leaves of the seedlings were also recorded 4 months after planting.

RESULTS

The moisture content of the seeds before treatments was 18 per cent. The microorganisms associated with the seeds in the pre-treatment isolations were *Rhizopus nigricans*,

Aspergillus niger, *A. terreus*, *A. fumigatus*, *Schizophyllum commune* and *Bacillus subtilis*. The seeds treated with Emisan and Captan did not yield any external microflora. Lesser population of fungi was noticed in the seeds treated with Thiram and Benlate. Microbial population of methyl bromide fumigated seeds and Sten 50 were similar to the untreated seeds. Changes in internal microflora population were not noticed in any of the treatments.

The effect of treatments on seed germination are presented in Table I. The percentage of germination under different chemicals ranged from 20.7 to 93.8 while the control had 87.6. Methyl bromide fumigation was found to reduce the germination percentage (23.7 to 79.3%). The impact of methyl bromide on germination percentage and the time taken for germination increased with

Table I. Effect of seed treatment on germination

Treatment	Percentage germination					Total
	20	25	at different intervals (in days)			
			50	110	140	
Methyl Bromide						
16 gm/m ³ -12h	0	0	45.5	29.0	2.1	76.6
Methyl Bromide						
24 gm/m ³ -12h	0	8.3	29.0	30.3	1.4	69.0
Methyl Bromide						
32 gm/m ³ -6h	0	0	33.1	20.0	0	53.1
Methyl Bromide						
40 gm/m ³ -6h	0	0	15.9	4.8	0	20.7
Emisan 0.1%	60.7	21.4	5.5	0	2.7	90.3
Thiram 0.2%	32.4	38.6	14.5	4.1	0	89.6
Sten 50 0.2%	15.2	39.3	29.6	3.4	2.1	89.6
Captan 0.2%	49.6	35.9	6.9	0.7	0	93.1
Benlate 0.1%	53.8	26.2	11.0	2.8	0	93.8
Control	40.7	17.9	20.0	9.0	0	87.6

the increase in dose. Wet fungicide treatments increased the germination over control. Higher percentage of germination was noticed in treatments with Benlate, Captan and Emisan. These treatments gave higher percentage of early germination (in 25 days time).

Data on seedling emergence and seedling vigour are given in Table II. The wet fungicide treatments improved the percentage emergence and seedling vigour over control.

DISCUSSION

Since species of *Aspergillus*, *Rhizopus*, *Schizophyllum* and *Penicillium* causing brown germ disease are usually present in the seeds prepared by the recommended method of seed preparation, it is necessary to take up proper seed treatments. Methyl bromide fumigation at the optimum seed moisture content of 18 per cent was found to delay germination indicating the penetration of the chemical to the embryo. Mok (1970) reported that methyl bromide fumigation affected viability of seeds with moisture content above 15 per cent and also suggested that *Dura* seeds at moisture content of 10 per cent can be fumigated at 23.89–29.44°C with 32 gm/m³ of methyl bromide for 18 h without impairing the viability, germina-

tion, emergence and vigour of seedlings. As a phytosanitary measure for importation, treatment of seeds (ungerminated and pre-heated) with methyl bromide 32 gm/m³ at room temperature for 2 h followed by 5 min soaking in 0.1% benlate solution has been earlier recommended (Kang, 1986). But methyl bromide fumigation is not practical in view of the impairment in viability and germination at low moisture levels. A trial on seeds with suspected seed borne pathogens in the embryo at different moisture levels ranging from 10–18% would give clues on the elimination of different pathogens.

Increase in germination observed in fungicide treated seeds is an indication of the elimination / reduction in microflora causing seed spoilage. This reduction in microbial spoilage has increased the emergence and vigour of seedlings. It is possible to reduce the internal microflora by increasing the period of exposure to fungicides, thus enabling absorption of fungicide solution. Among the fungicides Captan, Emisan and Thiram which reduced the microbial population and enhanced seed germination and seedling vigour are being recommended for phytosanitary seed treatments in storage and importation of seeds.

Table II. Effect of seed treatment on seedling emergence and vigour

Treatment	Percentage emergence	Mean height in cm.	Per cent increase over control	Mean No. of leaves	Per cent increase over control
Emisan 0.1%	93.3	21.51	22.56	4.30	26.47
Thiram 0.2%	94.8	23.27	32.59	4.25	25.0
Sten 50 0.2%	94.3	21.95	25.07	3.45	1.44
Captan 0.2%	85.8	22.20	26.49	4.19	23.23
Benlate 0.1%	88.4	20.91	19.14	4.08	20.0
Control	57.0	17.55		3.40	

ACKNOWLEDGEMENT

The authors are thankful to Dr. M. K. Nair, Director, Central Plantation Crops Research Institute, Kasaragod and Dr. K. U. K. Nampoothiri, Scientist in charge, C.P.C.R.I., Research Centre, Palode and Dr. K.K.N. Nambiar, Head of the Division of Pathology for the guidance. The help rendered by Mr. F. Bivera, Entomologist in charge, Plant Quarantine and Fumigation Station, Cochin and his colleagues in carrying out the fumigation studies is gratefully acknowledged. The authors thank the Director, C.A.B.

International Mycological Institute, London for identification of fungi.

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