

SEED TREATMENT

MOLECULES

FUNGICIDES IN SEED TREATMENT: PRESENT AND FUTURE MOLECULES

SUJOY SAHA, M. LOGANATHAN, A. B. RAI AND R. GARG

Indian Institute of Vegetable Research (ICAR), Varanasi-221 305, Uttar Pradesh, INDIA.

Seed treatment with fungicides to combat the seed-borne fungal pathogens is one of the major strategies of farmers, both in the global and national scenario. The reason being, it is always wiser, easier and cheaper to eliminate the pathogen from a few grams/kilogram of seeds, rather than to attempt spraying or dusting an entire field of standing crop. Seed treating fungicides may be used either for seed disinfestation or seed disinfection or seed protection. Fungicides meant for seed treatment are broadly categorised as those which are already registered and commercialised in India and those which are at development stages at different research institutions.

The fungicides which are widely used in India for seed treatment are as follows:

Mancozeb 75% WP: It is a protectant and contact fungicide and is fairly effective against external contamination of seed-borne smut fungi and surface-borne *Helminthosporium* of barley. It is fungitoxic when exposed to air, converted into isothiocyanate, which inactivates the sulphhydryl group of enzymes in fungi, thereby causing disturbance in fungal enzyme functioning. They are also effective against many fungi that cause seed rot and damping-off. It is very effective for potato tuber and groundnut treatment when combined with carbendazim.

Carbendazim 50% WP: It is a systemic fungicide with prophylactic and curative action. It shows a broad spectrum of fungitoxic activity against Ascomycetous fungi, fungi imperfecti and various Basidiomycetes (Hesse and Hiepko, 1974), but non-effective against Oomycetes and bacteria. Besides disease control, beneficial side effects like stimulation of growth, flowering and yield of plants are also observed in plants. It acts by disrupting the spindle formation during cell division of the pathogenic fungi.

Mancozeb 50% + Carbendazim 25% WS: It is a mixture of two fungicides for the control of seed and early soil borne diseases of crops caused by Ascomycetes, Basidiomycetes, Imperfect fungi and Oomycetes group of fungi. The effectiveness of this pre-mixed seed treatment fungicide has been demonstrated in many crops under different agro-climatic conditions in India, especially in ground nut and potato. Besides protecting the seeds, it also ensures their fast and uniform germination. It forms a uniform coating around the seed thereby preventing the attack of soil borne pathogens. It provides good crop stand and vigour thereby keeping the seedling and plant healthy.

Metalaxyl 35% WS: It is a systemic fungicide specific for seed rot and damping-off fungi such as *Pythium* and *Phytophthora*; downy mildew fungi such as *Peronospora* and *Pseudoperonospora*, and related fungi. It exhibits both apoplastic and symplastic movements providing long duration and effective protection during early stages of crop establishment. It works against oospore and conidial inoculum and has both protective and curative activity. However, prophylactic applications are more effective against the disease.

Tebuconazole 2% DS: It is a systemic triazole for control of specified diseases especially smuts, *Rhizoctonia* root rot, *Septoria* disease complex, and *Fusarium* root rot of wheat, barley and oats. Groundnut collar rot caused by a complex of *Rhizoctonia* sp. *Sclerotium* sp. and *Aspergillus* sp. can be controlled effectively by it. However, the dose specified for the particular crop, in the cases claim needs to be strictly followed.

Thiram 75% WG: It is a seed protectant fungicide registered for use on essentially all field crops. It is effective for seeds externally contaminated with seed-borne or soil-borne smut fungi (onion smut, covered smut, or bunt of wheat,