

Pre-sowing Seed Treatments

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SUMMARY

Maintaining the quality of seed is dependent on many environmental factors, some of which are moisture, temperature, humidity and storage conditions. Even though these factors are properly accounted for, seed quality may still be reduced by certain seedborne diseases or destroyed by insects and other pests. Research has shown that treating seed with one or more pesticides is the most economical and efficient way to protect seed from these pests and improve seed quality. It is the treatments given to the seeds to improve the germination and vigour potential and as well as to maintain the health of the seed. Since pesticides are poisonous, extra care and safety precautions must be taken when applying them and in handling seed after it has been treated.

INTRODUCTION

The term treated means to give an application of a pesticide or subject seed to a process designed to reduce, control or repel disease organisms, insects, or other pests which attack the seed or seedlings.”

Pre sowing seed treatments: It is the treatments given to the seeds before sowing to improve the germination and vigour potential and as well as to maintain the health of the seed. Pre sowing seed treatments includes the following

- Chemical treatments to improve germination and vigour potential.
- Insecticidal and fungicidal treatment.
- Special treatments



Chemical treatments to improve germination and vigour potential. Soaking or treating of seeds with nutrients vitamins and micronutrients is called chemical treatment. For ex. Paddy seeds are soaked in 1 % KCl solution for 12. Similarly 1 % NaCl 2 or KH 2 PO 4 is used in sorghum. In case of pulses seeds are soaked in ZnSO 4 , MgSO 4 and MnSO 4 100 ppm solution for 4 hours.

Insecticidal and Fungicidal treatments: Seed health is an important attribute of quality seed. If it is contaminated with seed borne pathogens and insect pests, it may result in severe yield loss or even crop loss in an entire area.

Benefits of the insecticidal and fungicidal treatments:

- Prevents the spread of plant diseases
- It protects the seed from seed rot and seedling blights.
- It improves the seed germination
- It provides protection from storage insects.
- It controls the soil insects.

Seed Treatment Fungicides:

Fungicides are applied to seed prior to planting to provide effective protection against many seed and soil-borne plant pathogens. Fungicidal seed treatment may be divided into three categories, depending on the nature and purpose of the treatment.

These categories are:

Seed disinfection - Disinfection is the elimination of a pathogen which has penetrated living cells of the seed, infected it and become established-for example, loose smut of barley and wheat.

Seed disinfestations - Disinfestation is the control of spores and other forms of pathogenic organisms found on the surface of the seed.

Seed protection - Seed protection is chemical treatment to protect the seed and young seedling from pathogenic organisms in the soil.

A given fungicide may serve in one or more of these categories.

Seed Treatment Insecticides:

Insecticides are often applied to seed to control or reduce insect damage to seed during storage and, to a lesser degree, to prevent damage from such insects as wireworms and seed corn maggots in the soil. Seed treatment materials are usually applied to seed in one of four forms: dust; slurry (a mixture of wettable powder in water); liquids; and planter-box formulations.

Safety: There is a general tendency to use chemicals that are safe for user and environment.

- Treated seed must be clearly labelled and under no circumstances be used for feed or food.
- Seed treatment should be carried out in a well-aerated area.
- Contact with chemicals through breathing of dusts and skin contact must be avoided.
- Protective clothing should be worn.
- As with all pesticides, empty containers should be properly disposed of and never reused in a household or on the farm.

Special treatments**Seed hardening treatment**

Seeds can be hardened for 2 purposes I) Drought tolerance ii) Cold tolerance. The effectiveness of the treatment depends upon the conduct of seed hardening process. The solution amount never be higher than the amount of the seeds. All solution added should be imbibed by the seeds. There should not be any leftover solution as it causes leaching effect. Once the seeds imbibe water, the germination process takes place. At the end of soaking period the seeds should be dried back to its original moisture content. These seeds when sown the germination will be completed earlier whereas in non-hardened seeds the process germination takes a longer period.

Chemicals used: CaCl₂, KCl, KH₂PO₄,

Seed fortification

Main aim is to supply nutrients to seeds. The main objective is to achieve the high vigour to overcome unfavorable soil reactions. eg.) seed fortification with MnSO₄ @ 0.5 to 1 %. will improve oxidation - reduction potential of seeds, which ultimately leads to higher germination.

Moist sand conditioning

It is a need based treatment the concentration can be increased upto 2-4 %. Amount of solution should be 1:1 ratio or slightly excess amount of water can be used. Protinaceous seeds should not be soaked in water (e.g) soybean, etc. for these seeds, mix the seeds with moist sand @ 5 to 10% MC. It should be kept for specified period.

Seed pelleting

Here the nutrients are coated on the seeds. This technique is very much adopted in forest tree seeds. Normally

in small seeds this technique is adopted. By pelleting we can increase the size of seed and we can make it free flowing one. Through this we can able to reduce the seed rate. It is also important for aerial sowing (gum arabica) in tree seeds.

Materials used: Nutrients, adhesive, filler material.

Inert materials: Lime, CaCO₃, Chalk powder.

Plant products: Neem, Notchi, Arappu, Arappu (*Albizia amara*) is found good contains a substance saponin (growth promoter) which is like GA in action.

Seed infusion

Infusion of nutrients and growth promoting substances with organic solvents like acetone and dichloromethane. The organic solvents, slowly increase the chemicals in to the seed. In this method there is no need for drying the seed materials to bring back the original moisture content of seed. The organic chemicals are evaporative in nature, after infusion is over, just we have to keep the seeds as such for 5 to 10 minutes in dry condition the organic solvents will evaporate during this time and we can perform sowing. Seed infusion can also be used for breaking the seed dormancy.

Osmotic priming

It is a very expensive, but it is a required process, particularly for large seeded legumes like peas, beans etc., They have high protein content and large embryo and are susceptible to soaking injury. High protein seeds are hygroscopic and hydrophilic. Osmotic priming is nothing but making the seeds to imbibe water very slowly. Osmotic solutions used are (PEG) (poly ethylene glyster). Maintol is highly toxic. PEG is inert and will increase very slowly the water in to seeds. By preconditioning through osmotic priming, the seeds are invigorated which results in uniform, early and higher field emergence and higher seedling vigour.

Fluid drilling

This is a technology evolved for mechanical sowing of seeds particularly the germinated seeds. The seeds are coated with a jelly material called guar gel. It is to have a buffer action to avoid damage of the germinated seeds during sowing.

Separation of viable seeds

It is a new concept particularly for groundnut. This is a good method to get desired seed germination and plant population. In case of groundnut the actual population is 30 plants/m² and seed multiplication rate in groundnut is 1:8. There are about 30-40% of dead seeds and of such dead seeds are eliminated, and then we will be able to maintain the required plant population in the field. This is the base for evolving this technology. This can be done in 2 ways. Manual separation based on radicle emergence (groundnut). IDS (Incubation - Drying and Separation) method.

CONCLUSION

Seed treatment provides a good insurance against diseases, soil-borne organisms and thus affords protection to weak seeds enabling them to germinate and produce seedlings. It acts has important component to increase total crop yield thus benefiting farmers and also the society by providing healthy, disease and pest free food grains.

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