



**FACULTY OF AGRICULTURAL SCIENCES
AND ALLIED INDUSTRIES**

SEED TREATMENTS

Based on the purpose of seed treatments it can be classified in to two groups

- A. Pre - sowing seed treatments
- B. Pre-storage seed treatments

A. 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 improve the health of the seed.

Pre sowing seed treatments includes the following

- a) Dormancy breaking treatments
- b) Chemical treatments improve germination and vigour potential.
- c) Insecticidal and fungicidal treatment.
- d) Accelerating the speed of germination treatments (other special treatments)
 - i) Seed hardening treatments
 - ii) Seed Fortification
 - iii) Seed infusion
 - iv) Osmotic priming
 - v) Fluid drilling
 - vi) Seed pelleting
 - vii) Seed hardening
 - viii) Halogenation treatments

a) Dormancy breaking treatments

b) Chemical treatments to improve germination and vigour potential.

Soaking / treating the seeds with nutrients vitamins and micronutrients etc., e.g., **Paddy** : Seeds can be soaked in 1 % KCl solution for 12 hours to improve the germination and vigour potential.

Sorghum : Seeds could be soaked in NaCl₂ (1 %) or KH₂PO₄ (1%) for 12 hours for improving the germination and vigour potential.

Pulses : Seeds can be soaked in ZnSO₄, MgSO₄ and MnSO₄ 100 ppm solution for 4 hours to improve the germination and vigour potential.

c) Insecticidal and Fungicidal treatments

These treatments are given to the seeds to improve and maintain the health condition of the seeds

Seed health : It is an important attribute of quality seed. A seed lot that meets high standards of germination, vigour, and purity but if it is contaminated with seed borne pathogens and insect pests, may be useless to farmers because it may result in severe yield loss or even crop loss in an entire area.

Benefits of the Insecticidal and fungicidal treatments.

1. Prevents the spread of plant diseases
2. It protects the seed from seed rot and seedling blights.
3. It improves the seed germination
4. It provides protection from storage insects.
5. It controls the soil insects.

Types of fungicidal and insecticidal seed treatments, they are 3 types they are

1. Seed disinfection
2. Seed disinfestation
3. Seed protectants

1. Seed disinfection

It refers to the eradication of fungal spores that have become established with in the seed coat (or) in more deep seated tissues. For effective control, the fungicidal treatments must be penetrate the seed in order to kill the fungus that is present.

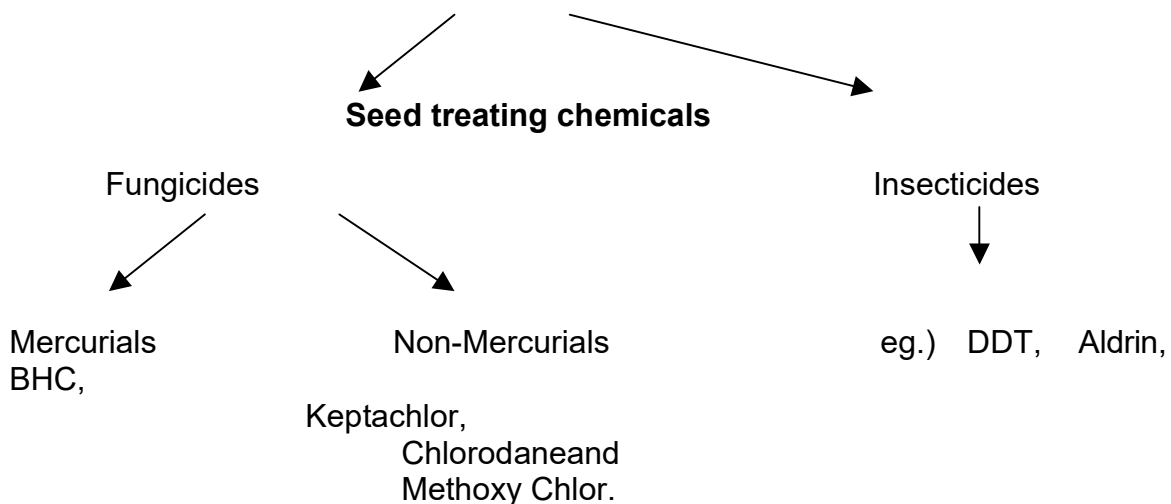
2. Seed disinfestation

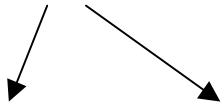
It refers to the destruction of surface borne organisms that have contaminated the seed surface but not infected the seed surface. Application of chemicals through chemical dips, soaks, fungicides applied as dust, shiny or light have been found successful.

3. Seed protection

The main purpose is to protect the seed and young seedlings from organisms in the soil, which might other wise cause decay of the seed before germination.

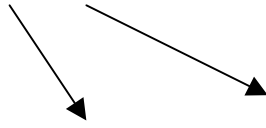
Seed treating chemicals





Organic

Inorganic



Organic

Inorganic

Mercurials eg.) Agrason Cerason	Mercurials (eg.) Mercuric chloride Mercurus chloride	Mercurials eg. Thiram Captan	Mercurials CUSO ₄ ,
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Materials

1. Organic materials eg.(Agrason)

Recommended for the treatment of small grains i.e pulses, cotton, and sunflower etc.,

- ❖ Proper dosage is critical, over treatment leads to seed injury and under treatment may fail to control disease.
- ❖ Seeds treated with these chemicals could not be stored for long period of time it will result in loss of seed viability.

2. Inorganic materials eg. Mercuric chloride, mercurus chloride and mercuric oxide.

- ❖ These chemicals can be treated with seeds, roots, tubers, garden and vegetable crops to control disease causing organisms.
- ❖ Excessive precaution should be taken while treating the seeds with these chemicals. Mercuric chloride is injurious to most of the seeds.

Non-materials

1. Organic non-materials (eg.) Thiram or captan

This is the mostly and widely used fungicides. Generally they are less effective than organic materials. But they are less damaging to the seeds and less dangerous to persons handling the seed. Excessive dosage is not harmful to the seed. Seeds can be stored for longer periods of time without suffering the injury from the treatment. Organic non materials are not determinant to the viability of injured seed. These fungicides will act as seed disinfectants or seed protectants.

2. Inorganic non-materials

Copper carbonate, copper sulphate, cuprous oxide and NasCO₄, (a mixture of Zn oxide and Zn hydroxide) copper carbonate and sulphate are used on wheat as bunt preventives. Cuprous oxide prevents seed decay and damping off in vegetables.

3. Insecticide treatments

Insecticides used alone tend to damage the embryo of the seed. However, when used in combination with a fungicide, they interact with each other and the damage is not as severe.

Formulation of fungicidal materials /insecticidal

Fungicidal / insecticidal seed treatment materials are available in the form of dusts, wettable powders and liquids.

1. Dusts : It is usually applied @ 200-250 gms / quintal of seed. Main disadvantage is dusty condition will prevail during the seed treatment and after handling.
2. Slurry : This type of fungicide is applied to the seed along with soap like water suspension which can be mixed with seed by using special slurry

treater.

3. Liquids : The use of liquid solution is known as the "quick wet ' method. Here a volatile fungicide is applied to the seed and it thoroughly mixed with them.
e.g. Chemicals like panogen, mercuran, etc. can be applied by this method.

d) Accelerating the speed of germination treatments.

i) Seed hardening treatment

Seeds can be hardened for 2 purposes I) Drought tolerance ii) Cold tolerance

The treatments are imposed to the seeds mainly to tolerate initial drought and cold. Cold tolerance treatment is given to germinated seeds, such treatments are given only to temperate crop and tree seeds.

The most important factors to be considered while seed hardening is.

- i) Seed ; solution ratio (1:1)
- ii) The duration of soaking is important
- iii) Method of drying.

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 left over 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. The seed when soak again the germination will be completed earlier. Whereas for non hardened seeds germination process takes a longer duration.

Chemicals used : CaCl_2 , KCl , KH_2PO_4 , (cc (cotton)

ii) Seed fortification

Main aim is supply nutrients to seeds. The main objective is to have the high vigour, to overcome unfavourable soil reactions. eg.) seed fortification with MnSO_4 @

to 1 %. will improve oxidation - reduction potential of seeds, which ultimately leads to higher germination. Fortification is given in two ways,

- a) Through solution
- b) Seed pelleting. eg) FeSO_4 1.0%.

Through solution

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 for dry purpose (e.g) soybean, etc. for these seeds, mix the seeds with moist sand @ 5 to 10% MC. It should be kept for specified period of time. The method is known as moist sand hydration.

Seed pelleting

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

Importance

- ❖ Normally in small seeds this technique is adopted .
- ❖ By pelleting we can increase the size of sees 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, CaCO_3 , Chalk powder.

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

iii) Seed infusion

Infusion of nutrients, growth promoting substances with organic solvents, like acetone and dichlormethane.

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 the organic solvents will evaporate during this time and we can perform sowing. Seed infusion can be used for breaking the seed dormancy.

IMPORTANT QUESTIONS:

1. Explain Indian seeds act 1966 in detail.
2. What do you understand by seed rule?
3. Briefly explain seed (control) order.
4. What is new seed policy? Explain its role.
5. Describe plant variety protection indetail.
6. Describe seed drying, it advantage aand the equipments used for seed drying.
7. What is seed processing? Describe the procedure in detail in some crops.
8. Define seed treatment. Explain different types of seed treatments and the chemicals used in this.
9. Differentiate between disinfection and disinfestations.
10. Explain seed grading/ processing and also discuss the equipments used for processing.