

SEED QUALITY ENHANCEMENT TECHNIQUES- SEED TREATMENT

SEED TREATMENT

- 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

❖ Types of Seed Treatment

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 maintain the health of the seed
- Pre sowing seed treatments includes the following
 - I. Chemical treatments to improve germination and vigour potential
 - II. Insecticidal and fungicidal treatment
 - III. Special treatments

I. Chemical treatments to improve germination and vigour potential

- Soaking / treating the seeds with nutrients vitamins and micronutrients etc.
- 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

II. Insecticidal and Fungicidal treatments

- ❖ **Seed health:** It is an important attribute of quality seed. Though a seed lot that meets high standards of germination, vigour and purity 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

- Seed may be affected by viruses, bacteria, fungi, nematodes and insects

- Seed pests and diseases of which the seed is a victim (e.g., grain weevils, *Tricoderma* spp., and storage pathogens such as *Aspergillus flavus*) should be distinguished from seed-borne diseases of which the seed is the vehicle of pest and pathogen dissemination (e.g., bunt of cereals, *Tilletia* spp.)

❖ **Seed Treatment Fungicides**

- Fungicides are applied to seed prior to planting to provide effective protection against many seed and soil-borne plant pathogens
- Chemical (fungicide) treatment guards against the various seed rots and seedling blights that occur during storage or after planting
- It is not usually a "cure-all" and will not provide disease protection throughout the growing season after the plants become self-sufficient. (An exception to this would be the control of loose smut by seed disinfection)
- Fungicidal seed treatment may be divided into three categories, depending on the nature and purpose of the treatment
- These categories are:
 - (1) seed disinfection
 - (2) seed disinfestation
 - (3) seed protection

- **Seed disinfection** - Disinfection is the elimination of a pathogen which has penetrated into 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
 - 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
 - Based on composition, seed treatment fungicides may be organic or inorganic, metallic or non metallic, and, until recently, mercurial or non-mercurial
 - Before the cancellation of the 'volatile mercurials, fungicides for treating seed were generally classified as volatile and non-volatile

- With the elimination of the volatile mercurials, most fungicides now approved for use on seed are classified as non-volatile
- When using this type material, complete coverage of the seed is necessary to obtain effective control
- Some of the systemics, a fairly new class of pesticides, may now be used as seed treatment materials. The desirability of having materials that would move inside the seed or plant and control the pest has long been recognized. Such materials are called "systemic."
- When used according to the manufacturer's recommendation (see label), a systemic moves through the host plant and controls or retards the growth of certain fungi and insects without affecting the host's metabolic system

❖ **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
- Combinations
 - Since some pesticides are selective in their control of pests, many times two or more compounds are combined in the treater tank, or an extra tank may be used, to give the spectrum of control needed
 - The manufacturers of pesticides are now making combinations available to seed processors, but should a processor blend two or more pesticides, the compatibility of the materials must be determined, since some combinations of materials may seriously reduce seed germination
 - Also, when applying two or more pesticides, even at different times, the sequence of application may be very important. Whether a single pesticide or a combination is to be applied to the seed, read the label and follow the manufacturer's directions carefully

❖ **Formulation of fungicides /insecticides**

- Fungicides / insecticides are available in the form of dusts, wettable powders and liquids

1. Dusts : It is usually applied @ 200-250 gms / quintal of seed. Main dis-advantage 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 throughly mixed with them

e.g. Chemicals like panogen, mercuran, etc. can be applied by this method

➤ **Safety**

- There is a general tendency to use chemicals that are safe for user and environment.
- Very toxic substances, such as organic mercurials (Ceresan and others) and very persistent fungicides, such as Hexachlorobenzene ((HCB), are being replaced by new chemicals, In the past, these chemicals have caused severe cases of poisoning, some resulting in death
- Most if not all occurred because treated seed was used for human consumption or livestock feeding instead of for planting.
- Even with the new, less toxic chemicals, the following safety precautions must be taken

1. Treated seed must be clearly labelled and under no circumstances be used for feed or food
2. 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
3. 3. As with all pesticides, empty containers should be properly disposed of and never reused in a household or on the farm