



## Seed Treatment: First step of Plant Disease Management

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Disease management is an important step in any crop establishment system. Agriculture depends on the growth of seeds. They are the first stage in the life-cycle of a crop and for any reason if seeds fail to germinate so the crop also fail. Emergence of field seeded crops may take several weeks for many species and represents a vulnerable stage of plant growth. During germination, seeds face a lot of challenges from seed and soil borne diseases to pests to environmental stresses. While seeds can overcome these on their own, the chances of success can be improved with seed enhancement. Seed treatment is one of the most effective ways to support the growth of seeds and reduce the challenges that they face.



This article presents many physical, biological, and chemical seed treatments for improved seed health. Seed treatment can also encourage healthy crops by improving their immunity and promoting uniform germination. Seed treatment enhances the resistance of the seeds, making them stronger against pathogens and pest attacks and stresses in their environment. Chemical or biological seed treatments can provide critical protection since the germination stage, protecting the emergence out of the soil and during the first stage of the crop cycle by preventing seeds against seed and soil-borne pathogens, seed-borne insects, diseases, and pests.

### Categories of seed treatment

- 1) Seed protection: Through chemical, biological and combination treatment designed to protect the seed and seedling from pathogenic organisms in the soil.
- 2) Seed dis-infestation: Control spores and other forms of pathogens on the surface of seeds.
- 3) Seed disinfection: Eliminate pathogens that have penetrated into living cells of the seed, infected it, and have become established.

### Types of seed treatments

**Physical methods of seed treatments:** Physical treatments include hot-water treatment (for loose smut of wheat at 52<sup>0</sup>C for 10 minutes), solar-heat treatment (loose smut of wheat), and the like.

**Biological methods of seed treatments:** Biological treatment includes, seed treatment with bio-control agents like *Trichoderma spp.* (fungal bio-agents), *Bacillus spp.* (Bacterial bio-agents) and *Pseudomonas spp.* etc.

**Chemical methods of seed treatments:** There are many types of commercial and home made seed treatments available today. Depending on the need of the specific crops for specific problem, farmers can pick a single or a consortium of multiple seed treatments with chemicals or bio-control agents. Here are describe the different types of seed treatments.

- ❖ Fungicide seed treatment can provide them protection and prevent fungal diseases. Seeds are especially highly susceptible to soil borne pathogens in the early stages of growth and some fungi can be hard to combat on their own.

- ❖ Insecticide seed treatments can provide protection against such pests with the added benefit of having a lower concentration of chemicals than the pesticides applied to fully-grown crops.
- ❖ Fertilizer seed treatments are another type of seed treatment that helps with plant growth. Seed treatments with bio-fertilizers can enhance fertilizer performance or supply micro-nutrients to the soil to enrich the growth environment for the seeds.

### Equipment used for Seed Treatment

			
<b>Slurry Treaters</b>	<b>Direct Treaters</b>	<b>Home-made drum mixer</b>	<b>Shovel</b>

### Precautions in Seed Treatment

- ❖ Most products used in the treatment of seeds are harmful to humans, but they can also be harmful to seeds. Extreme care is required to ensure that treated seed is never used as human or animal food.
- ❖ Care must also be taken to treat seed at the correct dosage rate; applying too much or too little material can be as damaging as never treating at all.
- ❖ If the seeds are to be treated with bacterial cultures also, the order in which seed treatments should be done shall be as follow: **FIR (Fungicides, Insecticides and Rhizobium)**

**How to help seed treatment in disease management:** Seed treatment is the first step in disease management. There are many advantages of seed treatment that are making them popular with farmers. Some of these advantages are as follows:

- Enhances plant growth with delivered nutrients, which makes crops stronger in competing with weeds;
- Helps in integrated pest management since colored kernels keep birds from eating them;
- Reduces the necessity of chemical applications (fungicides and pesticides) in subsequent growth stages;
- Decreases the occurrence of crop diseases due to pathogens and unfavorable growth conditions;
- Boosts roots growth and shoots vigor thanks to nutrients supply;
- Provides beneficial bacteria (e.g., rhizobia) if they are added to the filler;
- Protects crops from nematode infestations through nematicide seed treatment;
- Increases plant density and field productivity thanks to planting more viable seeds
- Allows collecting coated grains faster when they are spilled

### References

1. <https://www.croplife.com/crop-inputs/seed-biotech/seed-treatment-advantages-and-limitations/>
2. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/seed-treatment>
3. <https://eos.com/blog/seed-treatment/>