

Seed Treatment- Protection Against Diseases and Insects in Early Stages of Crop

P. Nagamani

Agricultural Research Station, Perumallapalle 517 505, ANGRAU

*Corresponding Author: p.nagamani@angrau.ac.in

Agriculture relies on the growth of seeds. They are the first stage in the lifecycle of a crop and if seeds fail to germinate, crops fail. Seeds face a lot of problem from diseases to pests to environmental stresses. However, 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.

Seed treatment refers to the application of biological, physical and chemical agents and techniques that can be applied to seeds to provide them protection. Seed treatment can also encourage healthy crops by improving their immunity and promoting uniform germination. While traditional crop protection methods that are applied on a broader level to the crops have their place, with seed treatment, the needs of every individual seed can be met. Seed treatment enhances the resistance of the seeds, making them stronger against 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 soil-borne pathogens, seed-borne insects, diseases, and pests.

Seed Treatments based on chemical

There are many types of commercial seed treatments available today. Depending on the need of the specific crops, farmers can pick a single or a combination of multiple seed treatments with chemicals or biological agents. Here are the different types of seed treatment

Fungicide

Seeds are especially vulnerable to fungi in the early stages of growth and some fungi can be hard to combat on their own. Fungicide seed treatment can provide them protection and prevent fungal diseases.

Insecticides

Pests are another concern that farmers have to factor in while looking at the early stages of growth. Many insects target seeds and can damage them before they even germinate. 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.



Fig 1 Demonstration of seed treatment

Microbial inoculants

Microbial inoculants are seed treatment products that can stimulate plant growth, promote soil biodiversity, and even address specific issues such as nitrogen fixation in legumes. With this beneficial microorganism are delivered directly to the area where the plant interacts with the soil, which encourages growth.

Plant growth regulators

With plant growth regulators, seeds have additional assistance for germination and an enhanced tolerance for stresses during the critical early stages of growth. This seed treatment for germination is also helpful when seeds have to germinate in tough conditions.

Fertilizers

Fertilizer seed treatments are another type of seed treatment that helps with plant growth. Seed treatments with biofertilizers can enhance fertilizer performance or supply micronutrients to the soil to enrich the growth environment for the seeds.

Advantages of seed treatment

- Protects germinating seeds and seedlings against soil and seed borne pathogens/insects.
- Seed germination enhancement.
- Early and uniform establishment and growth
- Enhances nodulation in legume crop.
- Better than soil and foliar application.
- Uniform crop stand, even in adverse conditions (less/high moisture)

Different methods of seed treatment

1. Dry treatment: Mixing the seed with pesticides/nutrients in powder form.
2. Wet treatment: Soaking the seeds in a pesticide/nutrient solution in liquid form.
3. Slurry treatment: Seeds/seedlings are dipped in slurry.

Rice seedlings example immersed in phosphate slurry.

4. Pelleting: It is the process of coating seed with enough seed ingredients to make the seeds larger, heavier, and consistent in size for sowing using seed drills. Pesticide pelleting is used to protect soil organisms and pests, as well as to repel birds, ants, and rodents.

Today's Modern Seed Treatments

Modern seed treatment products offer control of target pests and diseases and ensure the establishment of healthy and vigorous plants. Their formulation and industrial application also contribute to improvement in growers' and workers' safety and stewardship of the environment. Today's modern seed treatment products have to meet not only efficacy standards but also safety and environment standards. The newest active substances and formulations provide long-lasting, broad-spectrum, control of pests and diseases (depending on the specific active

ingredient). Modern formulated seed treatment products are precisely blended products consisting of several active ingredients, special wetting agents, colorants and sometimes bird repellents which are rigorously tested for their safety to the seed, the users and the environment

Meeting User's Expectations

Regulatory authorities, seed distributors and seed users have established high standards for the seed and seed treatment industries regarding the quality of a seed treatment and its application to the seed. The expectations are that the treated seed will be easy to plant and that the seed treatment will be effective in the field, safe to the applicators, the growers and the environment. The industry recognizes that seed treatment must provide "added seed value" (e.g. better emergence, higher seedling establishment, improved crop health, higher yields and improved crop quality). It expects seed treatments to be easy to handle and apply to seeds, to complement and protect genetic improvements, to function as part of IPM (Integrated Pest Management), to be safe and cost-effective in use and to reduce personal and environmental risks. Seed treatments, compared to conventional application of crop protection products, offer convenience to the grower, saving time and energy and reducing application efforts.

* * * * *