

### 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.

### Good Seed Treatment Practice

The seed industry and seed treatment applicators use an array of quality management systems to optimise the application process. These quality systems define the treatment process, handling of treated seed, worker protection, environmental stewardship and provide the information required to facilitate the safe and legal treatment of seed and the disposal of treated seed.

Seed treatment requires adequate standards and good application methods. These should be agreed upon between the involved parties on a case-by-case basis to insure producer, applicator, seed and environmental safety in the most cost efficient manner.

# Seed Seed Treatment Treatment

## A Tool for Sustainable Agriculture

Prepared by the Seed Treatment  
and Environment Committee of  
the International Seed Federation  
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### Seed Treatment

Seed treatments, in broad terms, are the application of biological, physical and chemical agents and techniques to seed that provide protection to seeds and plants and improve the establishment of healthy crops. This brochure deals with the application of chemical agents.

### The Role of Seed Treatment



Diseases and pests affecting crops can have devastating consequences in agricultural and horticultural production if not properly managed. Breeding is an excellent tool to build resistances against pests and diseases in the plants. However, breeding alone does not address all of the

agronomic challenges, therefore crop protection products are often needed and used for good crop management. These crop protection products can be applied during the growth of the crop but can also be added to the seed as a seed treatment. Seed treatments have played and are still playing a significant role in the history of mankind, in staving off hunger and starvation by improving the establishment of healthy crops.

## Evolution of Seed Treatments

Some of the first recorded seed treatments are the use of sap from onion (*Allium spp*) and extract of cypress in the Egyptian and Roman periods. Salt water treatments have been used since the mid-1600s and the first copper products were introduced in the mid-1700s. Other key milestones were the introduction of arsenic, used from 1740 until 1808 and the introduction of mercury, used from 1915 until 1982. Until the 1960s seed treatments had been only surface disinfectants and protectants. The first systemic fungicide product was launched in 1968. This systemic fungicide had not only seed surface activity but also moved into the plants protecting the young seedlings from airborne pathogens. Since the 1990s the crop protection and seed industries have developed and adopted new classes of fungicide, insecticide, and nematicide chemistry, expanding pest control while reducing user and environmental impact.



The seed and seed treatments industries have a long history of partnership and dedication in providing growers with high quality seed.

Today the seed must be as pest- and disease-free as possible and the treatment must provide protection against pests and diseases during germination, emergence and growth of the plant.

## Seed Treatment and Integrated Pest Management

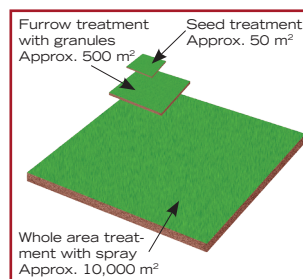
The FAO International Code of Conduct on the Distribution and Use of Pesticides (Revised version) adopted in 2002 defines Integrated Pest Management (IPM) as meaning “the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimise risks to

human health and the environment. IPM emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms”.

Seed treatments can be used as a primary tool in a successful Integrated Pest Management Program for sustainable agriculture since they target the pests and diseases with smaller amounts of active ingredients per hectare and are not introduced into the atmosphere. In many cases, without the use of seed treatment, growers would have great difficulty in controlling certain seed-borne and early season seedling pests and diseases and would have to resort to more expensive and less environment-friendly methods.

## Reduced Active Ingredient Loading into the Environment

Seed treatment is sometimes the only delivery route for the control of certain seed-borne pathogens. Seed treatment can also deliver high levels of efficacy for the control of early season pests and diseases at a much reduced usage rate compared to many foliar or soil applied alternatives.



Using a seed treatment reduces the area in contact with a crop protection product from 10,000 m<sup>2</sup> for foliar application or 500 m<sup>2</sup> for furrow application to only 50 m<sup>2</sup>.





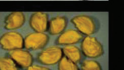


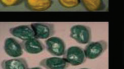







As an example, for an insecticide in corn, at a plant rate of 100,000 seeds per ha, the application rate is also reduced from 1,350 g active ingredient per hectare (ai/ha) for foliar application or 600 g ai/ha for furrow application to 50 g ai/ha for a seed treatment.

This reduced active ingredient loading minimises the impact on the

environment significantly by decreasing the effect on non-target organisms and the movement of the product in the environment.

## How Seed Treatments are Applied

Seed treatment is a term that describes both products and processes. Processes range from basic dressing to coating and pelleting. In all cases, the basis of good application techniques is to deliver the product to the seed at the correct dose and as uniformly as possible from seed to seed.

|   |  |   |   |
|---|--|---|---|
|    | Basis coat,<br>Weight increase 0.2-2%        |    |    |
|    | Complete Film coat,<br>Weight increase 3-20% |    |    |
|    | Encrustation,<br>Weight increase 1-5X        |   |   |
|  | Mini pill,<br>Weight increase 10-25X         |  |  |
|  | Standard pill,<br>Weight increase 15-100X    |  |  |

**Seed Dressing:** The most common method of seed treatment. The seed is either dressed with a dry formulation or wet treated with a slurry or liquid formulation. Dressings are applied both on-farm or in specialised seed treatment facilities.

**Seed Coating:** A special binder is used with a formulation to enhance adherence to the seed and begin to impact seed size and shape. Coatings require advanced treatment application technology.

**Seed Pelleting:** The most sophisticated seed treatment technology, resulting in changing the physical shape of a seed to enhance plantability and handling. Pelleting requires specialised application machinery and techniques and is the most expensive of the applications.



Depending on the type of desired treatment, various machines can be used.

The more complex the treatment, the more cost is involved. Many modern treatment machines can deliver specific formulation and dosing by way of a direct injection process. The most sophisticated treatment machines can

deliver the various formulations and additives as layers on the seed, which allows precise placement of the active ingredient.



## Meeting Users' 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 recognises 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.