Seed treatment – setting up for success

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Key words

seed treatment, treater calibration, primary application, secondary application, crop disease management

Take home message

Four simple rules to remember when it comes to on-farm application of seed treatments:

1. Start with clean seed for optimal results! Ensure your seeds are free from dust, chaff, broken seed, etc. before treating to maximise the effectiveness of seed treatment
2. Precision matters! Accurately calibrate slurry flow to seed flow to ensure the right amount of product reaches each seed, optimising coverage, protection and performance.
3. Optimise auger usage! Keep your auger at no more than 60% full to prevent overloading and ensure a consistent seed treatment application for every batch.
4. Coverage is crucial. Prioritise uniform coverage, remember coverage is king – aim for uniform application to guarantee comprehensive protection against pests and diseases, securing a healthy start for your crop.

Seed treatments – getting the crop off to the best start

The main goal of seed treating is to protect seeds from diseases, pests, and environmental stressors, as well as to enhance seed germination and early plant growth. Seed treatments involve applying products to the seed surface. This helps to control seed- and soil-borne pathogens, deter pests, improve nutrient uptake, and provide a favourable environment for seedling establishment.

On-farm seed treatment application refers to the process of applying treatments to seeds directly on the farm before planting. On-farm seed treatment application is typically done using specialised equipment that aims to give uniform coverage of the seed with the product.

Overall, seed treating aims to maximize the potential of seeds and promote healthy plant development.

Importance of seed quality

The initial growth of young seedlings depends on the energy reserves stored within the seed. Successful seedling establishment is more probable when the seed remains undamaged, is stored properly, and originates from a plant with water and sufficient nutrition. The process of seed grading maximises the sowing of seeds with high energy reserves of with a consistent large size and removes smaller or damaged seeds, as well as impurities.

Starting seed treatment

To ensure optimum coverage, maximum product efficacy and crop yield potential, use only high quality (germination and vigour), graded and cleaned seed from disease free crops.

Poorly graded seed can result in seed treatments binding with dust particles, chaff, cracked grain and weed seeds, which in turn can lead to a loss of seed treatment, clogging of machinery and restricted grain flow rates at sowing.

Dusty treated seed also has work health & safety (WHS) implications with increased risk of operator exposure to products.

Calibration for seed treatment

Accurate calibration of treating equipment is necessary to ensure that every seed is treated with the right amount of product in accordance with label recommendations. The calibration of the auger (seed flow) and spray equipment (slurry application) will vary between crop types and product usage. To ensure accurate application recalibration needs to be completed between crop types i.e., changing from wheat to barley and when changing products used in seed treatment as these changes can have a dramatic effect on seed flow and ultimately seed coverage.

Calibrating equipment involves measuring accurately the grain flow rate and slurry flow rate over a fixed period of time, and adjusting them accordingly to achieve the application rates per the product label.

Grain flow, operating pressure or spray nozzles may need to be changed if the measured slurry rate does not comply with the label directions. Repeat the calibration process if any adjustments are made to ensure the desired application rate is achieved.

1. Calculate grain flow rate

- Using a seed bin with a chute outlet, open the chute to run the auger at a constant speed (approx. 50–60% of auger capacity) to achieve constant grain flow. Once this auger capacity is achieved, make a mark on the chute outlet so a known flow rate can be returned to for that seed lot at any time.
- Collect grain over a recorded time (seconds)
- Weigh collected grain (kg)

Grain flow rate (tonnes/hr) = [grain weight (kg) / time (seconds)] x 3.6

Example:
If you measure 330 kg grain in 120 seconds, then the grain flow rate = [330/120] x 3.6 = 9.9 t/hr.

2. Calculate slurry (mixture of Seedcare product(s) plus water) flow rate

- Mix required amount of treatment and water as per label directions
- Run spray unit at constant pressure until the lines are full
- Collect slurry over a recorded time (seconds)
- Measure the volume of slurry (mL)

Slurry flow rate (L/hr) = slurry volume (mL) / time (secs) x 3.6

Example:
If you measure 990 mL of slurry in 60 seconds, then the slurry flow rate = [990/60] x 3.6 = 59.4 L/hr

3. Calculate slurry per tonne of grain

- Calibrate the slurry flow rate per tonne of grain

Slurry rate per tonne of grain = slurry flow rate / grain flow rate

Example: Using the figures above, 59.4 L of slurry would be applied to 9.9 tonne of grain per hour, giving an approximate application rate of 6 L of slurry per tonne of grain.

4. Document the calibration process

Record the final treater settings and any relevant information about the calibrating for future reference.

Application principles

Primary application is the initial process of applying seed treatment products onto the untreated seed. The aim of primary application is to treat seed evenly with the available equipment. Typically, on farm seed treatment units use spray nozzle(s) attached to a 12-volt pump for this purpose to achieve the best possible initial seed/product contact prior to secondary treatment.

Primary application is critical in ensuring the correct quantity of seed treatment is applied to each tonne of grain. In turn, this depends upon the ability to maintain uniform grain and slurry flow rates per tonne of grain treated. A pressure gauge, a filter and a slurry agitation system are also important components of any system.

Secondary application refers to the seed-to-seed transfer of the product as treated seed moves away from the primary application site via an auger.

Secondary application is critical in ensuring uniform seed coverage. In turn, this depends upon the time and nature of agitation. Note that as the treated seed dries, excess seed-to-seed contact can result in product loss due to flaking or dusting.

In general, four to six metres of travel in an auger will achieve sufficient secondary application without unnecessary loss of product through rub-off. Augers should be run at 50–60% capacity to improve mixing and seed to seed contact. The angle and the speed of the auger (as it was in the calibration process) should remain constant throughout application so that grain flow rates are not altered.

Compatibility

Mixing products to form a slurry can sometimes cause issues if the products are not compatible. Product mixtures that are physically incompatible can block filters and nozzles, leading to poor coverage and performance. Some mixtures are biologically incompatible leading to a reduction in product efficacy and performance.

Always read and follow label directions of all potential tank-mix partners before mixing or, if in doubt, contact the manufacturers for clarification. Water quality and product formulations can vary; thus, it is always wise to perform a 'jar test' to confirm physical compatibility before starting.

Jar test procedure

- Mix the products to be tested at planned dilution rate in a glass jar or similar
- Add each product in the same order as you would when making up slurry and agitate before adding other subsequent products
- Once all products are combined, thoroughly agitate the slurry
- Leave for an hour (or the longest time the solution will be kept in a tank)
- After the given time examine the slurry mix and look for any separation, settling out, particle formation etc. If free of any issues, then the mix is physically stable. If there are lumps etc, either look to a different mixing procedure or remove product (s) from the mixture altogether to achieve a compatible slurry
- Seek advice for alternative product options should separation, lumping or settling out occur.

If possible, apply the individual products in separate lines at the primary application to limit the effects of physical incompatibilities.

Note – physical compatibility does not indicate biological compatibility.

The desired outcome

All seed once treated should be uniformly covered. The only way to ensure all seed has been treated with the correct rate of the seed treatment is to follow the calibration steps, adhere to label rates and ensure each seed is completely covered. By monitoring the treated seed at various times during the seed treating operation the operator can make necessary changes to ensure a great result is achieved every time.

Additional seed treatment watchouts

- For the best result thoroughly agitate seed treatment products or slurry prior to application and during application.
- When transferring seed treatments or slurry's into your applicator hopper use a sieve/strainer to remove any product lumps that may have developed during prolonged storage and weren't removed through the agitation process or were incompatible as part of the slurry. This will help avoid blockages in your application unit.
- Allow the treated seeds to dry thoroughly before planting.
- Store the treated seeds in a cool, dry place until they are ready for planting.
- Remember to always follow the specific instructions and safety procedures provided by the seed treatment product manufacturer, as application methods and requirements may vary depending on the product.

Syngenta Seedcare will be running a number of on-farm seed treatment field days during 2024. Contact your local Syngenta Territory Sales Manager for details and to register for upcoming events in your area.

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