EVALUATING THE EFFECT OF BSN TREATMENT ON SEED GERMINATION AND VIGOUR

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This Insight (IN) is in response to questions asked by RLF's Distributor and Seed Partner about techniques and strategies in measuring the effect of **BSN** treatment on seed germination and vigour.

As a General Rule

BSN application to the seed needs to be within the recommended range of product and water and in accordance with published RLF Technical Bulletins and/or information documents.

When BSN is applied to the seed manually, vigorous shaking for a few minutes is required in order to uniformly apply the product to the seed coat, which then ensures absorption by all seeds and better response of the seed lot when planted.

In commercial drum applicators used by seed merchants and seed cleaners, uniform seed application is achieved in a shorter time and less drying time is required.

Touching the seed by hand is often a good experience for the applicator to 'get the feel' of good uptake by the seed. When this happens, seed surface feels almost dry and the individual seeds are separated.

Commercial applicators generally follow the BSN application with a fluency powder that ensures good separation of seeds at sowing time. I suggest however that this be a regular practice for small seeds such as grasses.

While the whole process of seed treatment is finished within a few minutes, it is best not to sow, or test the seed on the day of application. One day or more delay will allow for :

1. some extra moisture of the seed to be absorbed or evaporated, and to
2. move nutrients a little deeper into the seed body, ensuring less loss of nutrients during germination.

BSN being applied to bulk seed in Australia.

BSN being applied for small-scale farmer practice in Thailand.

Laboratory Testing

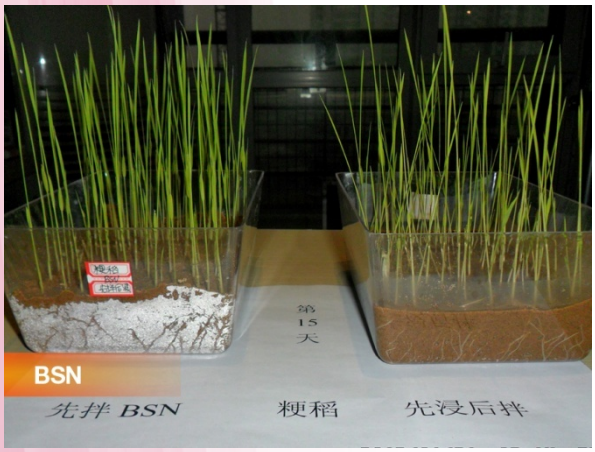
Measuring viability and vigour can also be done in a laboratory similar to seed testing procedures practised in seed testing laboratories. A major modification that is required however, is to change the filter paper method to soil in trays to :

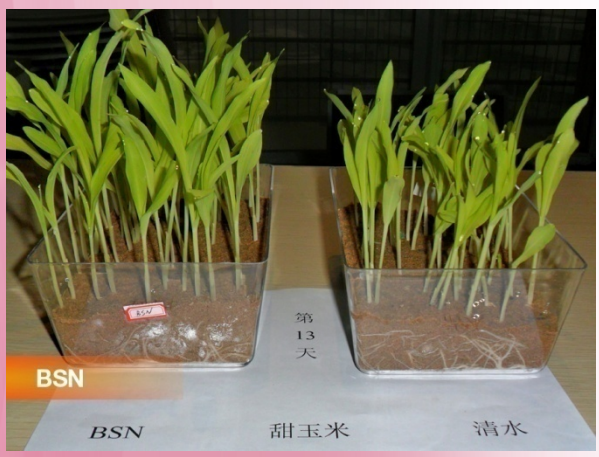
1. remove any adverse and/or direct effect of product on seed germination, and

2. to make the results applicable to the 'real world' when the farmer wants to see the benefits of seed treatment in the paddock.

Some examples of measured criteria in seed germination rate and vigour are as follows :

- Time course of germination (i.e. % germination after 3 days, 5 days, 7 days, etc.) - the vigorous seedlings emerge earlier.
- Percentage of abnormal seedlings (i.e. seedlings that fail to produce a normal plant) – the vigorous seeds show less abnormal germination.
- Measuring germination percentage under ideal conditions and then less than ideal conditions (i.e. stressed condition). Vigorous seeds germinate better under less than ideal conditions.
- Measuring seedling axis length (root + shoot) at completion of germination.
- Measuring fresh weight and dry weight of root and shoot in seedlings at one or more times after completion of germination.
- Measuring vigour should reflect what happens in the field, therefore tests must be carried out in similar soil, and in trays having the target (paddock) soil.
- When seeds are subjected to accelerated-aging (i.e. storage at high humidity and above optimum temperature) vigour test results correspond better to germination under field conditions.
- Aged seeds, or seeds that have been stored under less than optimal conditions are better indicators of vigour differences in laboratory or field trials. We have observed that in old Lucerne seeds, BSN reduces the percentage of abnormal cells and increases germination rate and vigour.





Germination and Vigour Testing in the Field

Germination, vigour and growth under field conditions can be measured by looking at :

- Time required for emergence.
- Evenness of the emerged seedlings.
- Root mass of the emerged seedlings.
- Rhizosphere colour and humus intensity – the root system of the BSN-treated crop develops better, and its rhizosphere colour is darker indicating more root exudation/activity that increases microbial activity of the rhizosphere.
- The best time-period to look for root and rhizosphere is about 10 days after emergence.
- Where differences are observed, photographs must be taken for comparisons of emergence, vigour and root/rhizosphere structure.
- Vigour of plant top can also be compared by taking periodic photographs or by recording leaf numbers in control and treated plants.
- Height of the randomly selected plants from control and treated plots can also be measured periodically to record any growth differences.
- In cereals, the tillers are emerged sooner in BSN-treated crop. This is demonstrated readily in a time-course emergence of especially tiller 1 and 2.
- In more mature stands, the thickness of the base of the main stem may also be a good indicator of plant vigour and growth.
- Periodic measurement of canopy mass and yield can be measured by a pasture meter.
- Mowing or cutting can also be performed to compare the growth differences between the treatments in pastures.

ASK THE DOCTOR

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