Rural Liquid Fertilisers

# How to Apply BSN to the Seed


*Trust. Grow. Yield.*

# HOW TO APPLY BSN TO THE SEED
# EASY TO UNDERSTAND INSTRUCTIONS AND GUIDE

## INTRODUCTION

This **'HOW TO APPLY'** information and instruction brochure has been written and developed with pictographs to give a clear guide and all-round understanding of the RLF product **BSN** Seed Primer and the important role that it plays in today's modern-farming practices.

In addition to general information and education, the brochure will address all of the different methods of applying **BSN** to the seed and will answer many questions relating to the use of this advanced product.

The following sections are included :

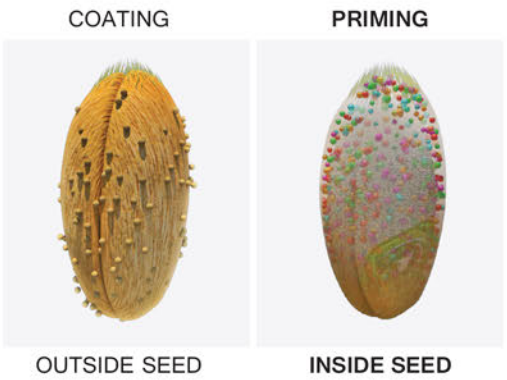


## WHAT IS A SEED PRIMER

**BSN Seed Primer** is a High-analysis formulation that fertilises the seed by supplying it with the optimum level of nutrients.

**BSN** is engineered to safely deliver the nutrients into the seed embryo (called imbibing or imbibe). With optimum nutrient in the seed, germination, early growth and young plant formation is directly supported through the early weeks of development. This practice is called Seed Priming and is proven to achieve growth, yield and many other environmental benefits because the plant is able to satisfy its nutrient requirements **directly from the seed**.

This technology is proprietary to RLF.

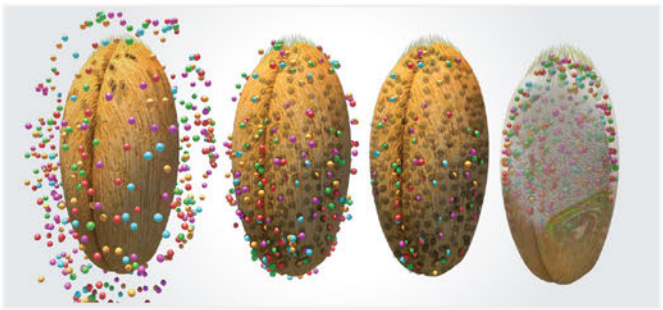



## HOW NUTRIENT IS IMBIBED INSIDE THE SEED

**BSN Seed Primer** gives the seed the best possible start available to it.

Through this seed priming function, the embryo registers and establishes the maximum yield potential of the plant. As a result this allows the plant to develop superior root mass and vigorous and strong shoots, tillers and leaf. **BSN** is unlike almost any other seed treatment product in the market today, but this means that a number of factors must be observed, in strict order, to achieve optimum results.

Fertilising the seed by using RLF Seed Priming technology is fast becoming the next step in modern farming practice.



Priming seed with **BSN** is a simple process, and it does not need expensive machinery to carry out this task. **BSN Seed Priming** is readily available for farmers and growers at every scale of operations. **BSN** + water is quickly absorbed by the seed, in fact the process can take as little as 20 minutes to fulfil. BUT, the seeds need time to settle before sowing can occur. This means that **BSN** can be applied any time between harvest and seeding, and for the best result, always prime the seed well before the next season's sowing time.

## HOW TO MIX BSN

### 1. First Mix with Water

**BSN Seed Primer** must first be mixed with water. Taking care with the water rates greatly assists the absorption process and provides for optimum delivery of nutrient to the seed. The water rates required for each seed type is given in the next section of this document.


### 2. Mixing with Other Chemicals


Shake Vigorously


Mix with Water


Mix with other Chemicals

**BSN Seed Primer** can be mixed with a wide range of other chemicals.

But caution must be exercised. Always apply **BSN** first, or mix water and **BSN** before adding chemicals. It is recommended that a simple jar test be carried out if you are unsure of product compatibility by mixing together and checking if a reaction occurs.

Do not mix with alkaline copper fungicides or inoculates.

You can also check at www.rlfchemtest.com

## HOW MUCH TO APPLY TO THE SEED




| Seed Type | BSN SS, BSN-10, Interceptor XS ml per 1kg of seed | | ml Water + Chemicals ml per 1kg of seed | | Total Application ml per 1kg of seed | |
|---|---|---|---|---|---|---|
| Corn, cotton, sunflower, pumpkin | 4 ml | + | 2 ml | = | **6 ml** | for 1kg seed |
| Zucchini, squash, melon, watermelon | 4 ml | + | 5 ml | = | **9 ml** | for 1kg seed |
| Wheat, barley, triticale, oat | 5-6 ml | + | 3-5 ml | = | **8-11 ml** | for 1kg seed |
| Rice (dry grain), safflower | 5-6 ml | + | 3-5 ml | = | **8-11 ml** | for 1kg seed |
| Beet, cucumber, okra, coriander | 6-7 ml | + | 8-9 ml | = | **14-16 ml** | for 1kg seed |
| Radish, turnip, Kohlrabi, parsnip, pepper | 7-8 ml | + | 8-9 ml | = | **15-17 ml** | for 1kg seed |
| Onion, leek, chive, garlic, tomato, eggplant | 8-9 ml | + | 9-10 ml | = | **17-19 ml** | for 1kg seed |
| Canola, carrot, lettuce, dill, chicory | 10-12 ml | + | 14 ml | = | **24-26 ml** | for 1kg seed |
| Celery, non-fluffy grass pasture seeds | 15-18 ml | + | 18-20 ml | = | **33-38 ml** | for 1kg seed |
| Fluffy grass pasture seeds | 30 ml | + | 33 ml | = | **63 ml** | for 1kg seed |

| Seed Type | BSN Ultra + BSN Hybrid ml per 1kg of seed | | Water & Pesticide ml per 1kg of seed | | Total Application ml per 1kg of seed | |
|---|---|---|---|---|---|---|
| Corn | 4 ml | + | 2 ml | = | **6 ml** | for 1kg seed |
| Rice (dry grain) | 5-6 ml | + | 5-6 ml | = | **10-12 ml** | for 1kg seed |
| Lucerne (Alfalfa) | 10 ml | + | 2 ml | = | **12 ml** | for 1kg seed |

## TYPES OF APPLICATION

### MANUAL APPLICATION


Spray and Mix


Bag or Packet


Container or Bucket

### MACHINE APPLICATION


Auger Spray Application


Drum Priming Application


Other Inline Application

## METHODS OF APPLICATION

**1. Spray and Mix Method** | Local farmer practice determines the best method of application to be used.

Spray and Mix

The **Spray and Mix method** uses 5 steps to apply BSN Seed Priming Fertiliser throroughly and evenly to the seed to ensure the nutrients are imbibed.

**STEPS**

1. **Spread out seed**
2. **Spray BSN + Water on seed**
3. **Mix seed to cover seed thoroughly**
4. **Store seed 24-78 hours**
5. **Ready to Sow**

### 1

Spread seed on sheet

Separate seed best possible

#### SPREAD

Spread out the seed as evenly as possible onto a clean plastic sheet so that the grains separate from each other.

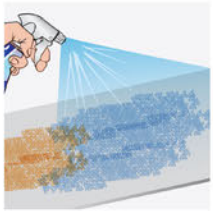
### 2


Mix BSN + Water

Use Spray Bottle

OR

Back Pack Sprayer



Spray Seed Uniformly

#### SPRAY

Mix BSN Seed Priming Fertiliser with water as per the seed type requirements. Put into a spray bottle or back pack sprayer and shake vigorously until thoroughly combined.

Spray mixture uniformly onto the seeds - making sure all seeds are sprayed.

### 3

Roll seed to make sure covered

#### MIX

**If possbile**, with two people holding the opposite sides of the plastic sheet, roll it, so that the tipping action mixes the applied BSN uniformly. Repeat this for a few minutes until such time as the whole seed surface receives the BSN solution. This process can be stopped when the seed surface is nearly dry when touched.

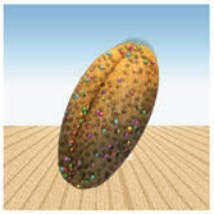
### 4


Incubate +24 Hours to 78 Hours

#### +24 Hours to 78 Hours

Keep the seed wrapped in a clean breather bag or bucket/container for 24-hours (at a minimum) or a few days if time permits.

### 5



Ready to Sow

Sow the seeds as per normal farmer practice.

**2. Container or Bucket Method** | Local farmer practice determines the best method of application to be used.

Container or Bucket

The **Container or Bucket method** uses 5 steps to apply BSN Seed Priming Fertiliser throroughly and evenly to the seed to ensure the nutrients are imbibed.

**STEPS**

1. **Add seed to container or bucket**
2. **Mix BSN + Water**
3. **Cover seed thoroughly and evenly**
4. **Store seed 24-78 hours**
5. **Ready to Sow**

1

Add Seed to Container

OR

Add Seed to Bucket

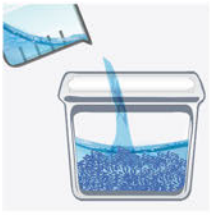
### ADD SEED

Add seed into the container or bucket.

2


Mix BSN + Water

Mix Thoroughly



Pour on BSN + Water Mix evenly on Seed

### APPLY

Mix BSN Seed Priming Fertiliser with water as per the seed type requirements. Put into a beaker and mix until thoroughly combined.

Pour on the BSN + water mix so all seeds are evenly covered.

3

Shake or Mix to Cover

Make sure seed evenly covered

### MIX

Mix or shake to cover seed thoroughly and evenly.

4

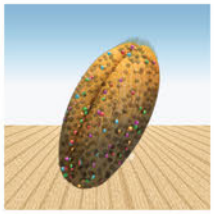

Incubate +24 Hours to 78 Hours


Incubate +24 Hours to 78 Hours

### +24 Hours to 78 Hours

Keep the seed in container or bucket (or wrapped in a clean breather bag) for 24-hours (at a minimum) or a few days if time permits.

5



Ready to Sow

Sow the seeds as per normal farmer practice.

3. **Bag Method** | Local farmer practice determines the best method of application to be used.

Bag or Packet

The **Bag method** uses 5 steps to apply BSN Seed Priming Fertiliser throroughly and evenly to the seed to ensure the nutrients are imbibed.

**STEPS**

1. **Add seed to bag or packet**
2. **Pour in BSN + Water**
3. **Shake to cover seed thoroughly**
4. **Store seed 24-78 hours**
5. **Ready to Sow**

1

Bag or Packet

**ADD**

Add seed into the bag or packet.

2


Mix BSN + Water

Mix Thoroughly

Uniformly Apply BSN

**APPLY**

Slowly pour the mixture of BSN and water from the top of the bag or packet. Pour the mixture uniformly so that the whole body of seed gets its share and coverage by the mixture.

3

Shake Thoroughly

**MIX**

Shake the bag or packet thoroughly so that the BSN mixture is covering all the seeds evenly.

Be certain that the mixture is not applied to one location only since it will not treat the whole seed lot uniformly.

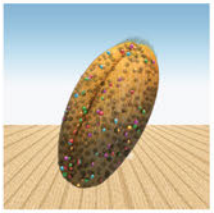
4


Incubate +24 Hours to 78 Hours

**+24 Hours to 78 Hours**

Incubate seed for +24 hours (at a minimum) in the bag or in a clean container or if time permits for longer +78 hours.

5



Ready to Sow

Sow the seeds as per normal farmer practice.

## 4. Auger Spray Application Method

Auger Spray Application

Larger farming operation will use the application spray systems in seed loading equipment to apply BSN Seed Priming Fertiliser to the seed during transfer from storage.

**STEPS**

1. **Decant BSN + Mix Water into the pump**
2. **Activate pump spray system**
3. **Activate seed transfer**

1

Decant BSN into Applicator

Pump during seed transfer

Use spray applicator in Auger

Decant BSN + mix with water in the spray pump applicator. Activate spray application system built into the seed transfer auger.

2

Seed is covered during transfer.

Seed is covered during transfer

3


Ready to Sow

+24 Hours. Ready to sow.

## 5. Drum Priming Application Method

Drum Priming Application

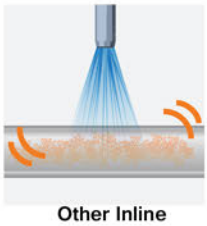
The use of Drum Priming is typical to large scale or commercial seed operations.

BSN can be applied using this method. Things to note are :

1. Water rates may change;
2. Fluency powder may be used (if needed)

Please refer to RLF Technical Services for further details as required.

## 6. Inline Engineered Application Solution



Other Inline Application

BSN can be applied as an engineered solution to an inline coating or treatment process as part of a commercial coating operation.

This is normally a specialty system or practice and the incorporation of the BSN Seed Priming Fertiliser application into each system is establish for each purpose.

# How to Apply BSN to RICE Seed




## Rice Seed Application Methods

The following three methods can be adopted and used for rice seed treatment when using **RLF BSN Seed Priming Fertiliser** products.

Method No. 1 is the closest application method to current small farm practice in most Asian countries, however Methods No. 2 and No. 3 may give a better result.

**The RICE SEED APPLICATION METHODS are:**

1. **Soak Method**
2. **Mix + Cover Method**
3. **Spray + Mix Method**

## 1. RICE SEED Soak Method | Local farmer practice determines the best method of application to be used.


Soak

The **Soak method** uses 6 steps to apply BSN Seed Priming Fertiliser to the rice seed. This method is closest to common or typical farmer practice.

### STEPS

1. **Soak Rice Seed**
2. **Drain**
3. **Mix BSN + Water**
4. **Pour BSN on Rice Seeds**
5. **Wait 24 hours+**
6. **Ready to Sow**

1


Soak

### SOAK

Soak 20kg of rice seed for 24-hours (usually rice is in a permeable bag)

2

Drain

### DRAIN

Drain the extra water

3


Mix BSN
+ Water

### APPLY

Apply 125ml BSN Seed Priming Fertiliser to 10-litres of water and mix thoroughly (for 20kg of rice seed)

4

Uniformly
Apply BSN

Slowly pour the mixture of water and BSN from the top of the bag. Pour the mixture uniformly and slowly, so that the whole body of rice seed gets its share of the mixture. Be certain that the mixture is not applied to one location only since it will not treat the whole seed lot uniformly

5


Incubate
+24 Hours

### +24 HOURS

Incubate rice seed for a further 24-hours

6

Ready to Sow

### READY TO SOW

Sow the rice seed as per normal farmer practice

## 2. RICE SEED Mix + Cover Method | Local farmer practice determines the best method of application to be used.


Mix + Cover

The **Mix + Cover method** uses 7 steps to apply BSN Seed Priming Fertiliser to the rice seed. This method is more effective than method 1.

**STEPS**

1. **Mix BSN + Water**
2. **Add Rice Seed**
3. **Add water to cover seed**
4. **Wait 24 hours+**
5. **Drain**
6. **Wait 24 hours+**
7. **Ready to Sow**

### 1


Mix BSN + Water

Mix Thoroughly

#### MIX

Mix 10-litres of water with 125ml of BSN Seed Priming Fertiliser in a container with a total volume of 30-litres and agitate thoroughly. (for 20kg of rice seed)

### 2


Add Rice Seed


Add more water (if needed) to achieve coverage

#### ADD RICE SEED

Add 20kg of rice seed into the container and leave stand for 24-hours

### 3

Drain


Incubate +24 Hours

#### DRAIN

Drain and incubate the rice seed for a further 24-hours in the same container

### 4

Ready to Sow

#### READY TO SOW

Sow the rice seed as per normal farmer practice

## 3. RICE SEED Spray + Mix Method | Local farmer practice determines the best method of application to be used.

Spray and Mix

The **Spray + Mix method** uses 6 steps to apply BSN Seed Priming Fertiliser to the Rice Seed. This method is more effective than method 1.

**STEPS**

1. **Spread out Rice Seed**
2. **Mix BSN + Water**
3. **Spray BSN + Water on Seed**
4. **Mix Thoroughly**
5. **Wait 24 hours to 78 hours**
6. **Ready to Sow**

### 1

Spread seed on sheet

Separate seed best possible

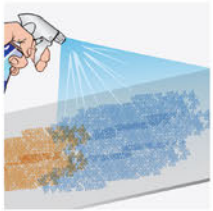
#### SPREAD

Spread 20kg of rice seed onto a plastic sheet so that the seed separate from each other as best as possible.

### 2


Mix BSN + Water

Use Spray Bottle



Spray Seed Uniformly

#### SPRAY

Mix 125ml of BSN Seed Priming Fertiliser with 125ml of water in a spray bottle and shake vigorously until thoroughly combined. Spray the mixture uniformly onto the grain lot.

### 3

Roll seed to make sure covered

#### MIX

With two people holding the opposite sides of the plastic sheet, roll it, so that the tipping action mixes the applied BSN uniformly with the seed lot. Repeat this for a few minutes until such time as the whole rice seed surface receives the BSN solution. This process can be stopped when the seed surface is nearly dry when touched.

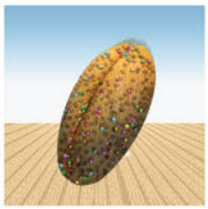
### 4


Incubate +24 Hours to 78 Hours

#### +24 Hours to 78 Hours

Keep the rice seed wrapped in a breather bag for 24-hours (at a minimum) or a few days if time permits.

### 5



Ready to Sow

Sow the rice seed as per normal farmer practice

## KEY OBSERVATIONS ABOUT BSN AND SEEDS

### Important Instructions and Precautions

- Do not add extra Trace Elements to **BSN Seed Primer** as this could inhibit seed germination or cause seed toxicity.
- It is always best to use clean seeds for priming as dusty seeds can cause stickiness. Dust on the seed can also tie-up nutrients on the seed surface, reducing the effectiveness of **BSN** seed priming uptake, with less nutrient imbibed inside the seed.
- For fungicide/pesticide compatibility check first at www.rlfchemtest.com or perform a simple jar test.
- When mixing with a liquid fungicide add water to **BSN Seed Primer** first. (Always BSN + Water + Fungicide)
- Rhizobial inoculates should NOT be mixed with **BSN Seed Primer**.

### When Priming Seed for Storage

- It is best, wherever possible, to use fresh seeds for priming. Older seeds may have a lower germination rate when stored under sub-standard, or less than ideal conditions.
- Seed viability (i.e. longevity) is maintained best when it is stored in a cool dry place.
- **BSN Seed Primer** can be applied to seeds any time between harvest and seeding. For the best result, prime seeds well before sowing time and if possible preferably during the dry season following harvest.
- Allow maximum ventilation to dry the primed seed-lot.
- Seeds stored at high temperature or in moist conditions run the risk of a reduced rate of germination. If seeds (especially rain-affected seeds) are stored for many months then they must be tested for germination suitability before treating with **BSN Seed Primer**.
- Contamination of wild radish seeds can drastically reduce germination rates. It is therefore best to make sure the stored seeds and silos are free from this contamination.
- Rain-affected seeds must pass the viability tests before being primed with **BSN Seed Primer**.
- When seeds are primed with a mixture of **BSN Seed Primer** and other chemicals there is no guarantee that the germination rate would be satisfactory over long-term storage. Germination tests are recommended before sowing if this is the case.

### When Priming Seed at Seeding Time :

- If seeds are primed at seeding time you may notice that the treated seed-lot volume increases by approximately 10%. (This is reversed quickly when seeds lose their extra moisture). But when you drill treated seeds soon after treatment you may need to allow for increased seed volume if the volume increase is not yet fully reversed. It is always recommended that at least 24-hours is allowed between priming the seed with **BSN Seed Primer** and sowing.

## KEY FACTS ABOUT BSN SEED PRIMER

- BSN primed seeds absorb (imbibes) water faster. This is due to the active ingredients in BSN Seed Primer breaking down the barriers to water penetration in the seed coat.
- The seed coat in cereal crops contain more than 50% of the total seed mineral nutrient reserves. BSN Seed Primer indices ion exchange in the seed coat releasing stored nutrients and facilitating utilisation by the seed embryo.
- BSN speeds up imbibition since it is an osmo-primer (i.e. draws water into the seed). The osmo-priming effect of BSN is due to its highly concentrated ortho-phosphate and trace elements.
- BSN Seed Primer is also a nutritional primer. It increases the level of essential elements in the grain from 2 to 10 times.
- BSN Seed Primer increases the available phosphorous (inorganic phosphorous) of seed by up to 350% compared to untreated seed. This is because some 70% of seed phosphorous is is as phytic acid and is unavailable during early germination. The higher available phosphorous resulting from BSN Seed Primer is the most important factor 'kick-starting' the germination, by supplying energy for growth and setting higher yield potential.
- Optimum pH for phytase activity is about 4. The low pH of BSN Seed Primer stimulates phytase activity and converts more phytic acid (unavailable phosphate reserve of the seed) to available phosphate.
- With BSN Seed Primer increased biological activity in the rhizosphere is experienced. This is due to more exudation of metabolites from the root system, resulting in higher temperature in the root zone.
- The BSN increased rhizosphere activity and exudation of organic acids (i.e. ascitric acid) releases soil-based phosphate bound to calcium (in alkaline soils) or soil-based phosphate the is bound to aluminium, iron and manganese in acid soils.
- The BSN increased rhizosphere activity, and faster root growth protects roots from disease, in contrast to disease susceptibility in a slow growing root system.
- Research shows that phosphorous and most trace elements are suboptimal and variable in seed-lots and have a greater impact on yield of late sown crops.

The key facts and findings listed above support the visual responses seen in seedlings and their rhizosphere when treated with BSN Seed Primer. Such changes translate to increased yield at harvest. With late planting and lower temperature zones (usually well below the optimum range of 12°C to 25°C) the speedy germination and establishment allows the crop to intercept and utilise soil nutrients faster.

More information is available at www.seedprimer.com.

www.ruralliquidfertilisers.com