Induct® EXO PEANUT

Peanut Inoculant with EPS Technology

EPS Activation

NEW TECHNOLOGY ADVANCEMENTS IN NITROGEN FIXATION PEANUT INOCULANT

Manufactured, Distributed, and Guaranteed by:
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WHAT IS EPS ACTIVATION TECHNOLOGY?

Exopolysaccharides (EPS) are extracellular polymers that are weakly associated with the rhizobia cell surface and abundantly released into the surrounding environment (Image 1). This extracellular matrix performs a diverse range of functions, giving the micro-organism an adaptive environmental advantage to secure on-seed and in-soil viability. EPS activation technology ensures that the bacteria are protected from unfavourable conditions on the harsh seed coat and soil conditions. MBFi has developed premium inoculants containing proprietary EPS activation technology by manipulating environmental factors and stress conditions resulting in increased EPS concentration.

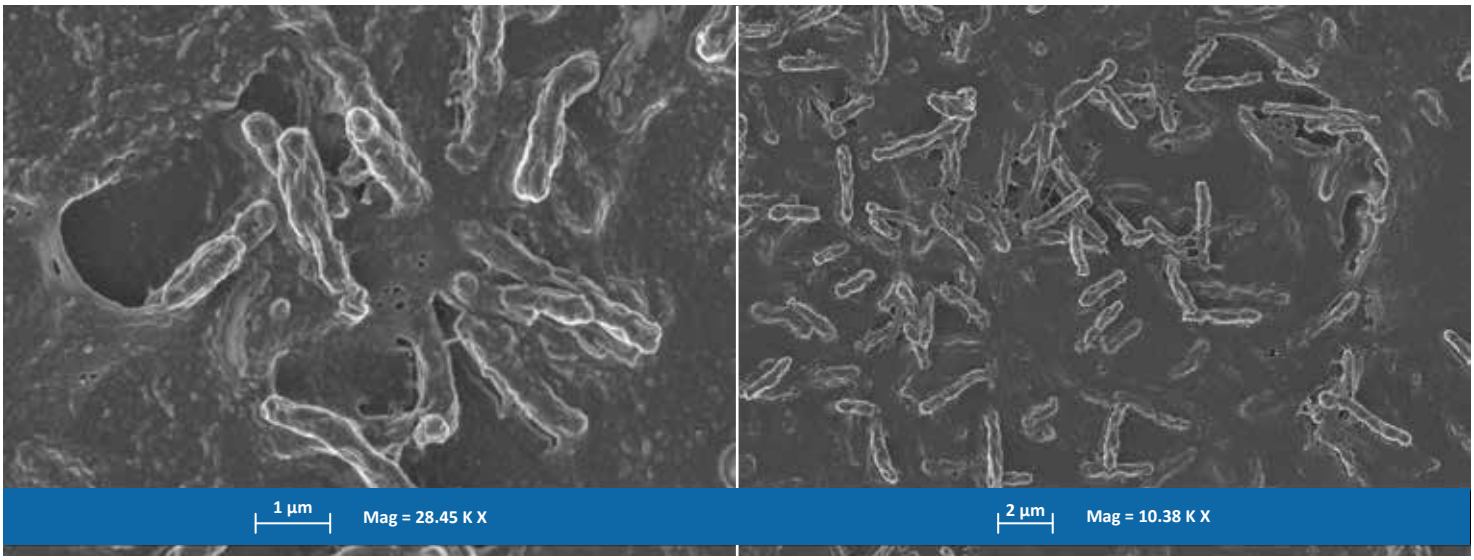

Figure 1: Visualization of EPS that formed over *B. japonicum* cells using Scanning Electron Microscopy.

WHAT DOES EPS LOOK LIKE?

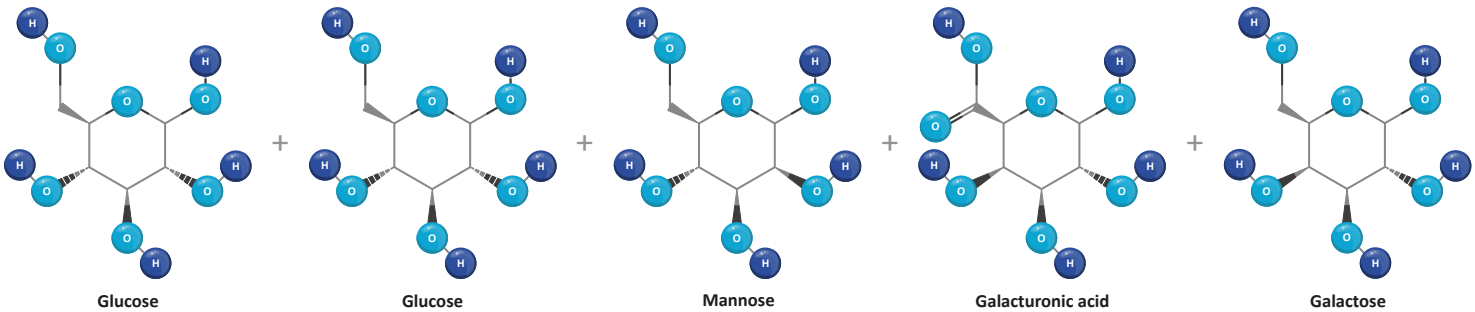

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Figure 2: Typically, the EPS structure of *B. japonicum* is composed of glucose, mannose, and galacturonic acid in a 2:1:1:1 molar ratio, with a varying portion of galactose and 4-O-Methyl galactose.

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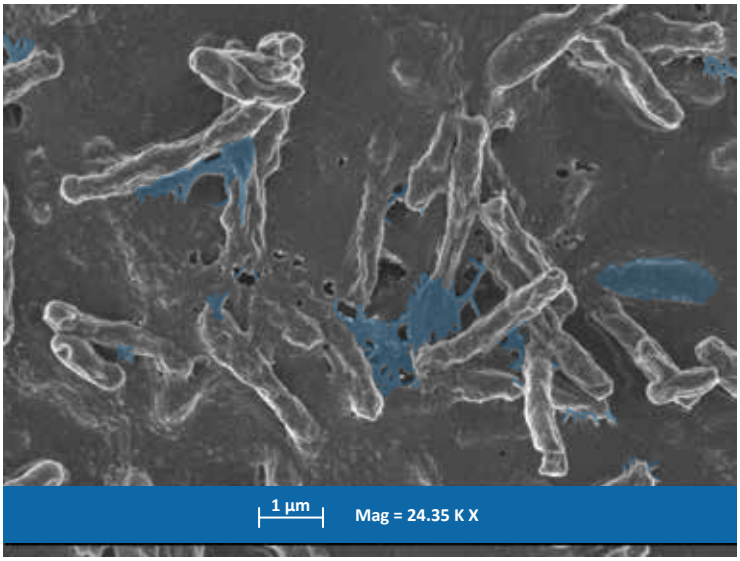

Figure 3: Scanning Electron Microscopy photo of the formation of EPS between cells of *B. japonicum.*

There is a clear increase in EPS production (Figure 3) when using Induct Exo with its EPS Activation Technology. The production of EPS enables better communication and quorum sensing between bacterial cells. It demonstrates how EPS can fully surround and protect the bacterial cells from environmental stresses and desiccation. This unique formation of an EPS matrix leads to improved bacterial survival and nodulation thereby increasing yields for farmers.

EPS Activation

HOW DOES IT WORK?

1. IT PROTECTS BACTERIA AGAINST BIOTIC AND ABIOTIC STRESS
The EPS form a protective barrier around the bacterial cells and improves microbial habitability and survivability.

2. SUPPRESSION OF PLANT DEFERNCE RESPONSES
EPS results in the suppression of host defense responses and can therefore increase nodulation infection.

3. ENHANCED INTERACTION BETWEEN RHIZOBIA AND PLANT
Recognition of EPS by the host plant accelerates host bacteria communication, thereby increasing the infection process.

4. ACT AS A NUTRIENT TRAP
EPS can act as a carbon reserve and accumulate other nutrients and molecules. The EPS matrix traps compounds from the soil water phase and permits their use as nutrient and energy sources.

5. PHYTOALEXIN PRODUCTION IN THE HOST
EPS stimulates the accumulation of phytoalexins in the early in leguminous plants and thereby increases plant defenses.

6. IMPROVES SWARMING CAPABILITY
Swarming is a multicellular movement towards/over the surface. A higher EPS concentration improves the swarming capabilities of rhizobia toward the root system.

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SCIENTIFICALLY DEVELOPED RANGE OF HIGH-QUALITY LIQUID RHIZOBIUM INOCULANTS WITH EPS ACTIVATION TECHNOLOGY

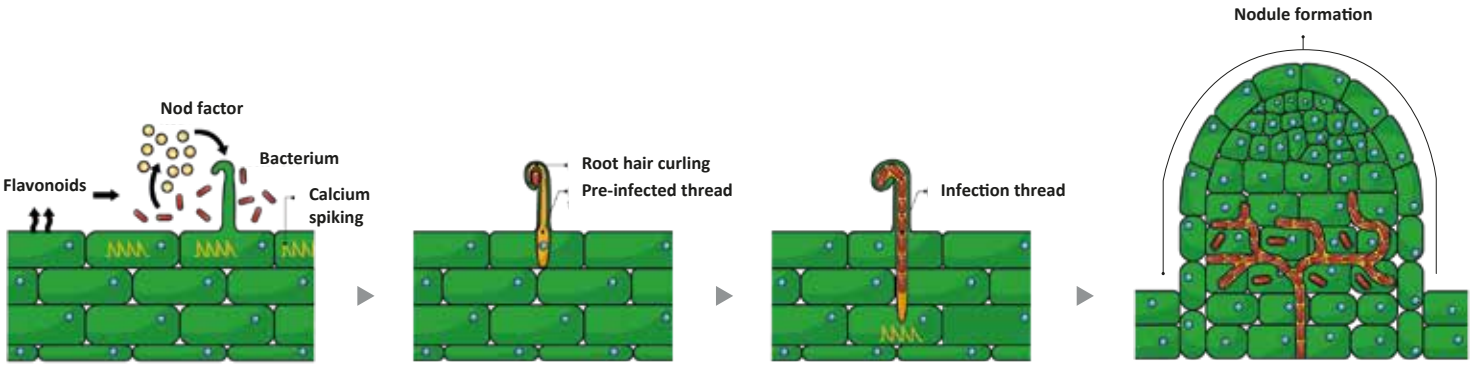
Nitrogen is an essential element required in large quantities by leguminous plants for growth. Although nitrogen is available in the atmosphere it occurs in an unusable form and is unavailable to plants. For this reason, farmers have been known to use synthetic fertilizers to meet the nitrogen demands of their leguminous crops. However, long term use of these fertilizers negatively affects the soil environment and in turn financially impact farmers. To escape the use of synthetic fertilizers, farmers can now rely on Biological Nitrogen Fixation (BNF). MBFi has scientifically developed a range of Premium Rhizobium Inoculants with EPS Activation Technology for legume crops which allows for consistent and reliable BNF.

PRODUCT	CFU/ml	SHELF LIFE	
Induct PEANUT	2 x 10^9	12 Months (1 Season)	4 L Bladder treats up to 10 acres in furrow
Induct® EXO PEANUT	4.5 x 10^9	12 Months (1 Season)	4 L Bladder treats up to 10 acres in furrow

WHAT IS BNF?

BNF is a process in which certain microorganisms (such as rhizobia) convert atmospheric nitrogen into a form that plants can absorb and utilize for growth. In turn the plants provide the microorganisms with a sheltered environment to live and access to carbon and nutrients. This symbiotic relationship between nitrogen-fixing bacteria and plants plays a crucial role in maintaining soil fertility and promotes better plant growth and productivity.

Recognition and Signal Exchange are the first steps of nodulation formation. The plant roots secrete compounds called flavonoids which trigger the rhizobia in the soil to produce Nod factors. The Nod factors attract rhizobia towards the root which then attach to the root hairs. This binding causes an influx of calcium and the root hair begins to curl around the rhizobia which induces the formation of infection threads. These threads grow through the root hair cells and into the root cortex. As the infection threads advance, the rhizobia multiply and spread within the root cortex. This triggers the plant to form specialized structures called nodules. Inside the nodules, the rhizobia convert atmospheric nitrogen into ammonia through nitrogen fixation. This ammonia is then used by the plant to produce amino acids and other nitrogen-containing compounds essential for growth.specialized structures called nodules. Inside the nodules, the rhizobia convert atmospheric nitrogen into ammonia through nitrogen fixation. This ammonia is then used by the plant to produce amino acids and other nitrogen-containing compounds essential for growth.



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