FMC An Agricultural Sciences Company

BIOLOGICALS

by

FMC

Better Biology. Bigger Potential.

2027 Product Guide



Better Biology.
Better Possibilities.

Agriculture is always evolving – and so is our understanding of what plants need to thrive.

Our biological crop solutions harness the power of biology to support plant health, performance, and resilience throughout the growing season. From enhancing nutrient utilization and supporting healthy plant growth to helping crops respond to environmental stress, each product is developed with one goal in mind: helping growers get more from every acre.

This product guide brings together a portfolio of biological solutions, backed by our 40 years of crop protection expertise and 120 years of biological research from our partner, Novonesis, all developed for practical use in the field.

Because when we put biology to work, we create new possibilities for healthier crops, stronger performance, and better results.

FMC experience:
40+ years

Acres Treated:
20M+

Biological Field Trials:
1000+

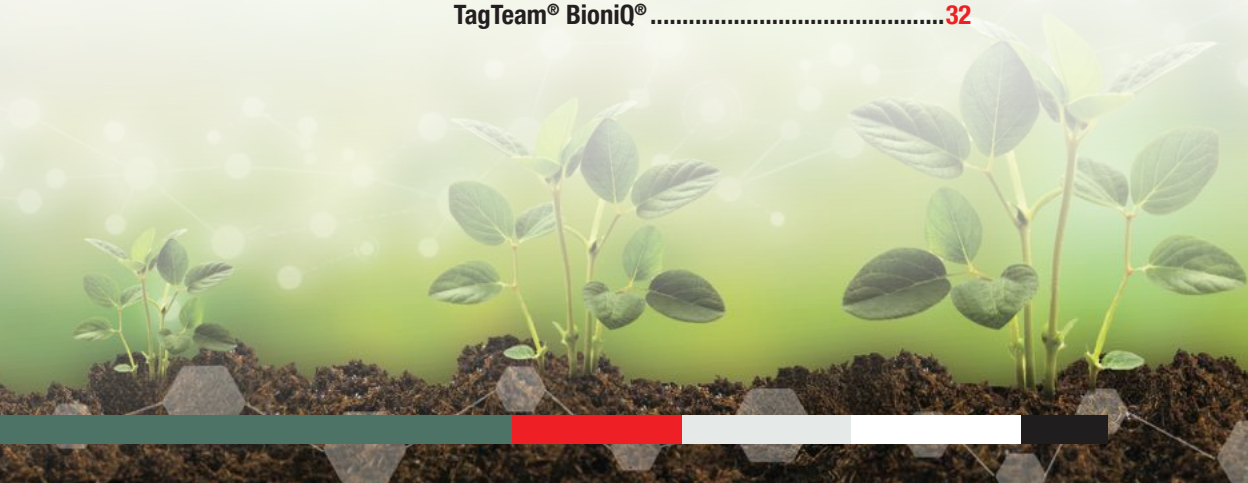
Retail Partners:
100+

BIOLOGICALS
by
FMC

BIOLOGICALS
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Biologicals

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Inside FMC Biologicals

Biologicals play a powerful role in improving nutrient availability, helping you get more from your fertilizer investment. These beneficial microbes and LCO signalling molecule boost nitrogen fixation in pulse crops and increase the availability of phosphate and other key nutrients in most major crops, promoting stronger nutrient uptake for early, vigorous growth and abiotic stress tolerance.

Inoculants – Biology that starts with the seed and soil

Product	Biological active(s)	Function
BioniQ®	*Penicillium bilaiae* (two strains)	Solubilizes inorganic phosphorus in both warm and cool soils.
	Bacillus amyloliquefaciens and *Trichoderma virens*	Increase nutrient availability and uptake while supporting stronger root and shoot growth.
Cell-Tech®	*Rhizobium leguminosarum (pea, lentil) or Bradyrhizobium japonicum (soybean)*	Supports root nodule formation and biological nitrogen fixation in peas and lentils.
Cell-Tech® DS	*Rhizobium leguminosarum (two strains)*	Supports nodule formation and biological nitrogen fixation.
Cell-Tech® Multipulse	*Rhizobium leguminosarum* and *Mesorhizobium ciceri*	Helps form nodules on pea, lentil, chickpea, faba bean and vetch roots to support biological nitrogen fixation.
JumpStart®	*Penicillium bilaiae* (two strains)	Solubilizes inorganic phosphorus, making it more available for crop uptake.
Nitragin® Gold	*Sinorhizobium meliloti* (alfalfa and sweetclover); *Rhizobium leguminosarum biovar trifolii* (clover)	Fix atmospheric nitrogen to support crop growth and yield potential.
Optimize® FXC DS	*Bradyrhizobium japonicum* (two strains)	Fixes atmospheric nitrogen in soybeans.
	LCO signalling molecule	Promotes earlier nodulation and increases associations with mycorrhizal fungi.
QuickRoots®	*Bacillus amyloliquefaciens*	Makes soil-bound phosphate more available for plant uptake.
	Trichoderma virens	Supports the uptake of nitrogen, phosphate and potassium.
TagTeam®	Crop-specific rhizobia: *Rhizobium leguminosarum, Mesorhizobium ciceri* or *Bradyrhizobium japonicum*	Fix atmospheric nitrogen in pea/lentil, chickpea or soybean, respectively.
	Penicillium bilaiae (two strains)	Solubilizes inorganic phosphorus for greater crop availability.
TagTeam® BioniQ®	*Rhizobium leguminosarum* or *Mesorhizobium ciceri*	Fixes atmospheric nitrogen.
	Penicillium bilaiae (two strains)	Solubilizes inorganic phosphorus in warm and cool soils.
	Bacillus amyloliquefaciens and *Trichoderma virens*	Increase the availability and uptake of nitrogen, phosphorus and potassium.
	LCO signalling molecule	Signals the plant to initiate the nodulation process earlier and encourage beneficial mycorrhizal fungi which increases nutrient and water uptake.

Foliar/In-Season – Biology that works with the growing crop

Product	Biological active(s)	Function
Ratchet®	LCO signalling molecule	Foliar-applied signalling molecule that improves photosynthetic capacity and sugar production, supporting stress tolerance and crop performance.

PRODUCT	CROP	FORMULATION	N FIXATION	P SOLUBILIZER (fertilizer P)	P SOLUBILIZER (organic P)	N,P,K UPTAKE	LCO SIGNALLING MOLECULE
BioniQ®	Multi	Wettable Powder		•	•	•	
Cell-Tech®	Pea/Lentil	Peat	•				
Cell-Tech®	Soybean	Granule	•				
Cell-Tech®	Soybean	Liquid	•				
Cell-Tech®	Soybean	Peat	•				
Cell-Tech® DS	Pea/Lentil	Liquid	• (2 strains)				
Cell-Tech® Multi-Pulse	Pea/Lentil/ Chickpea/ Faba Bean/Vetch	Granule	•				
JumpStart®	Multi	Granule		•			
JumpStart®	Multi	Liquid		•			
Nitragin® Gold	Alfalfa/Sweet Clover Clover	Clay Powder	•				
Optimize® FXC DS	Soybean	Liquid	• (2 strains)				•
QuickRoots®	Multi	Wettable Powder			•	•	
QuickRoots® Planter Box	Corn	Talc			•	•	
Ratchet®	Multi	Liquid					•
TagTeam®	Pea/Lentil	Liquid	•	•			
TagTeam®	Soybean	Improved Granule	•	•			
TagTeam® BioniQ®	Chickpea	Peat	•	•	•	•	
TagTeam® BioniQ®	Pea/Lentil	Improved Granule	•	•	•	•	•
TagTeam® BioniQ®	Pea/Lentil	Peat	•	•	•	•	
TagTeam® BioniQ® IG	Chickpea	Improved Granule	•	•	•	•	
TagTeam® BioniQ® IG	Faba Bean	Improved Granule	•	•	•	•	

Dig Deeper into Biologicals

What can Biologicals by FMC do for your crop? How does the LCO signalling molecule work? When does double inoculation make sense? And how can biologicals help you get more from your fertilizer investment? Find answers, practical insights, and the science behind biological crop solutions, all in one place at FMC's Biological Crop Solutions Insights.

Find FMC's Biological Crop Solutions Insights all in one place

Learn how the LCO signalling molecule helps plants start strong and finish stronger

See when double inoculating soybeans makes sense

Find out why bionutrition matters for maximizing yield

Discover why phosphate availability matters

Notes

BioniQ®

On Seed Applicatons | 3 Actives | Wettable Powder

CROPS:
BARLEY
CANOLA
MUSTARD
OAT
RYE
WHEAT

Stronger Roots. Bigger Yields.

Key Benefits:

- Three modes of action to support root and shoot development, increasing water and nutrient availability (N, P, K)
- Facilitates the solubilization, uptake and utilization of phosphorus fertilizer
- Improves early season growth and establishment across all soil types, soil pH levels, and temperatures
- Season long root colonization supporting higher yield potential
- Compatible with our new Avoda® PRO fungicide seed treatment for reliable protection against a complete label of seed- and soil-borne diseases in cereals

Biological Actives & Function:

Active	Function
Penicillium bilaiae (two strains)	Proven to increase plant available phosphorus through the solubilization of soil and fertilizer bound phosphorus
Bacillus amyloliquefaciens	Produces a phytase enzyme to mineralize organic phosphorus into a plant available form
Trichoderma virens	Promotes a more extensive root system which supports faster seedling establishment and shoot development

Field Grower Trials:

	Average (bu/ac) Increase	Trial Number
Total Average	3.9	9
Average Cereal	4.8	4
Average Canola	3.3	5

2025

(When compared to grower standard practice)

Formulation:

All Crops

Wettable Powder "A" 1 x 333 g bottle

Wettable Powder "B" 1 x 450 g bottle

=

10 boxes per case

Wettable Powder (2-part co-pack: 333 g + 450 g)/box = 10 boxes per case

Application Rates:

Crop	783 g Box (bu)	Recommended Water Volume/Box (L)
Barley	250	34
Canola	10 bags	5
Mustard	10	5
Oat	250	24
Rye	250	39
Wheat	250	42 (30 for bare seed and Avoda® PRO seed treatment)

Mixing Instructions:

Bare seed: Add the entire contents of both BioniQ® bottles (Wettable Powder "A" & Wettable Powder "B") to the recommended rate of water, mix well, apply to seed.

Cereal tank-mix: Add both BioniQ® bottles ("A" & "B") from one box to the recommended water volume, minus the seed treatment needed to treat 250 bu, mix well. Add the water/BioniQ® mixture directly into the seed treatment, mix well, apply to seed.

New Reduced Water Rate for Wheat with Avoda® PRO Fungicide Seed Treatment

Seed Treatment	Sequential Application (Days)	Simultaneous Application (Days)	Tank-Mix Application (Days)	Water Rate for 1 box of BioniQ® for 250 bu (L)	Seed Treatment Rate for 250 bu (L)	Tank-Mix Amount Applied per 100 kg Seed (mL)
Bare seed	60	60	60	30	-	440
Avoda® PRO	60	60	60	7.9	22.1	440

Compatibility:

See page 40 for BioniQ® seed treatment compatibility by formulation and crop.

Proof of Performance:

BioniQ® Improved Uniformity & Root Establishment in Canola



BioniQ® JumpStart® Untreated

Source: Anaheim, SK.

BioniQ® Increases Foliar Growth for a Faster Start in Wheat



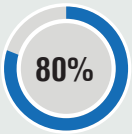
BioniQ® Untreated

Source: Taber, AB. Non-irrigated land.

In-Field Yield Trials

Canola (40 Trials)

Untreated	47.3 (bu/ac)
BioniQ®	50.2 (bu/ac)



Win Rate

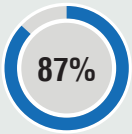


Yield Advantage

Source: Results were collected from 40 farmer-conducted, large-scale, side-by-side trials conducted in Western and Eastern Canada from 2017-2025.

Wheat (30 Trials)

Untreated	72.1 (bu/ac)
BioniQ®	76.5 (bu/ac)



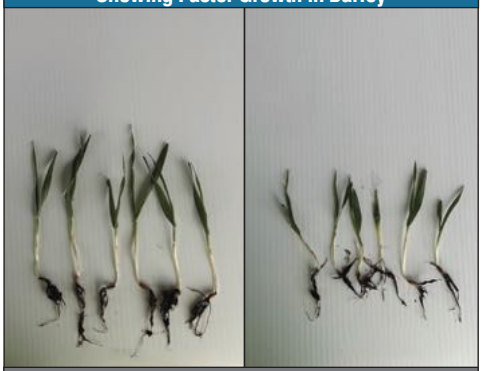
Win Rate



Yield Advantage

Source: Results were collected from 30 farmer-conducted, large-scale, side-by-side trials conducted in Western Canada from 2017-2025.

Showing Faster Growth in Barley



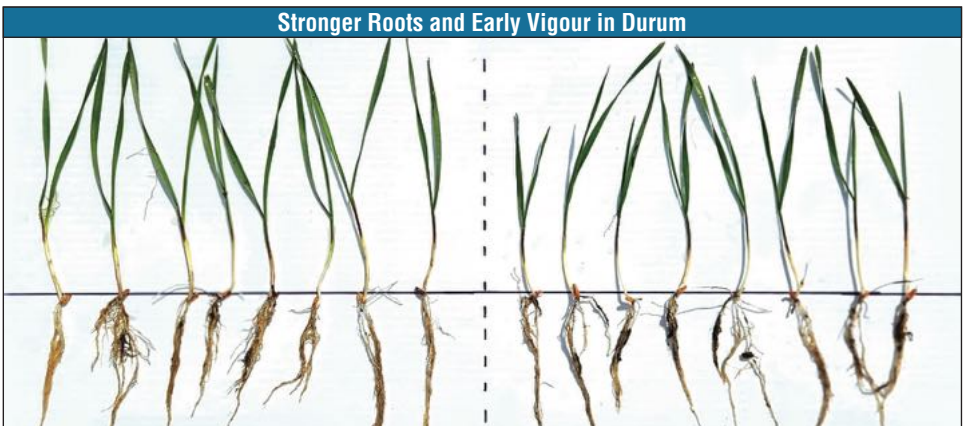
Source: Clavet, SK.

Phenomenal Growth Performance in Oats



Source: Carnduff, SK.

Stronger Roots and Early Vigour in Durum



Source: Assiniboia, SK.

Cell-Tech®

In-Furrow Applicaton | 1 Active | Granular | Liquid | Peat

CROPS:
LENTIL
PEA
SOYBEAN

Unlock More Nitrogen, Unlock More Potential.

Cell-Tech® is a single-action inoculant that enhances nitrogen fixation, helping pulse and soybean crops thrive.

- Delivers specially selected rhizobia that form nodules on plant roots effectively and efficiently
- Designed to work in all soil types, delivering consistent performance
- Available in peat and liquid forms, giving growers flexibility in how they apply it
- Apply in combination with JumpStart® for phosphorus solubilization

Biologicals Actives:

Biological Actives	Function
Rhizobium leguminosarum	Fixes nitrogen
Bradyrhizobium japonicum	Fixes nitrogen

Formulation(s):

Crop	Actives	Type
Pea, lentil	*Rhizobium leguminosarum*	Peat
Soybean	*Bradyrhizobium japonicum*	Liquid, peat, granule

Application:

Liquid Formulation

Rates:

Crop	Size (L)	Volume of Seed Treated (bu)
Soybean	3.1	50 units
	12.5	200 units

Liquid Directions:

- Apply directly to soybean seed at a rate of 278 ml/100 kg seed
- Planting window on bare soybean seed is four days
- Cell-Tech® liquid can be applied with other seed treatments, but the planting window may be reduced (see below for guidelines)

Peat Formulation

Rates:

Crop	Size (kg bag)	Volume of Seed Treated (bu)	Slurry Water Rate* (L)
Pea	2.20	50	4.0
Lentil	2.20	30	2.5
NEW RATE Soybean	2.32	40 units	3.0

*Approximate water volume for peat slurry application.
** Rates may change depending on other additives.

Peat Directions:

- A separate sticker is not needed. Cell-Tech® peat has its own sticker in the formulation.
- Can be applied one of three ways:
  - Recommended: Mix with cool, clean water and apply to seed as a slurry (refer to above table)
  - Dry to pre-moistened seed
  - By adding water while applying Cell-Tech®
- Make sure inoculated seed is evenly coated
- Inoculate bare seed up to 48 hours before seeding
- Can be used with different seed treatments, but planting windows vary according to type of seed treated, seed application method and seed treatment used (see below for guidelines)

Granular Formulation

Rates:

Crop	Row Spacing	Application Rate (lb/acre)	18.0 kg bag (acre/bag)	454 kg tote (acre/bag)
Soybean	7 in.	6.2	6.5	161.5
	8 in.	5.4	7.3	185.4
	9 in.	4.7	8.4	213.0
	10 in.	4.3	9.3	232.8
	12 in.	3.6	11.0	278.1
	15 in.	2.9	13.8	345.2
	24 in.	1.8	22.2	556.1
	30 in.	1.4	28.6	715.0

Cell-Tech®

Compatibility:

See page 43 for Cell-Tech® seed treatment compatibility by formulation and crop.

Packaging:

Pea/Lentil		Peat	7	x	2.2 kg bag	=	
Soybean		Peat	7	x	2.32 kg bag	=	
		Liquid (East only)	4	x	3.1 L	=	
		Liquid	1	x	12.5 L	=	
		Granular	1	x	18 kg	=	
		Granular	1	x	454 kg	=	

NEW

Cell-Tech® DS Liquid

On Seed Applicaton

In-Furrow Applicaton

1 Active

Liquid

CROPS: PEA LENTIL

More Flexibility at Seeding.

Cell-Tech® DS is a liquid, dual-strain inoculant developed for pea and lentil growers using an in-furrow application system. Its concentrated formulation supports effective nodulation and biological nitrogen fixation and can be used in-furrow.

Key benefits:

- Two *Rhizobium leguminosarum* strains developed for pea and lentil
- Supports effective nodulation and biological nitrogen fixation
- Designed for convenient in-furrow application
- Provides **5 day stability** on bare seed when used as a seed-applied inoculant

Biological Active and Function:

Biological Actives	Function
Rhizobium leguminosarum (two strains)	A dual-strain inoculant that supports nodule formation and biological nitrogen fixation in pea and lentil

Formulation:

Liquid inoculant for in-furrow or seed-applied use.

Seed Application:

Application rate	Pea coverage (bu)/10.4 L bladder	Lentil coverage (bu)/10.4 L bladder
80 mL/27 kg seed	129	129
	Pea coverage (bu)/3.2 L bladder	**Lentil coverage (bu)/3.2 L bladder**
	40	40

Bare-seed planting window: five days.

In-furrow Application:

Apply at 3 mL per 1,000 ft. of row (304 m). Use the rate corresponding to your row spacing.

Row width (inches)	Recommended product rate (mL/ac)	Acres treated/10.4 L bladder
8	195	53
9	175	60
10	160	66
12	130	80

Cell-Tech® DS Liquid

Compatibility:

See page 45 for Cell-Tech® DS Liquid compatibility by formulation and crop.

Packaging:

Pea/Lentil		Liquid	1	x	10.4 L	=	
		Liquid	4	x	3.2 L	=	

NEW

Cell-Tech®
Multi-Pulse

In-Furrow Applicaton | 2 Actives | Granular

CROPS:
PEA
LENTIL
CHICKPEA
FABA BEAN
VETCH

One inoculant, multiple pulses, one strong start.

NEW Cell-Tech® Multi-Pulse replaces Cell-Tech® P/L with two specially selected rhizobia strains in one convenient granular inoculant. Applied in-furrow, it supports effective nodulation and enhanced nitrogen fixation across chickpeas, faba beans, lentils, peas and vetch. **Be sure to follow the new Multi-Pulse application rates.**

Key benefits:

- One granular inoculant for five pulse crops
- Multi-crop flexibility – one granular inoculant for five pulse crops
- Specifically selected rhizobia strains help establish effective nodulation to support nitrogen fixation
- Designed to provide effective nodulation even under cooler soil conditions
- Available in an 18 kg bag and a 454 kg tote
- More nutrient support when needed – where phosphate availability is limited, Cell-Tech® Multi-Pulse can be applied alongside JumpStart® to help improve phosphate uptake

Biological actives and functions:

Biological Actives	Function
Rhizobium leguminosarum	Supports nodule formation and biological nitrogen fixation in pea, lentil, faba bean and vetch
Mesorhizobium ciceri	Supports nodule formation and biological nitrogen fixation in chickpea

Formulation:

Granular crumble formulation for in-furrow application.

Application Directions:

- Apply Cell-Tech® Multi-Pulse granules in-furrow at the rate specified for your row spacing
- Fill the tank to match or slightly exceed seed requirements. Do not overfill the tank, as this may compact the granules.
- Do not auger the product into the tank
- Do not mix granules in the same tank with seed or fertilizer
- Do not leave granules in the tank overnight, as condensation may cause lumps to form
- Refer to the product label for complete use instructions

IMPORTANT – NEW APPLICATION RATES: Cell-Tech® Multi-Pulse replaces the previous Cell-Tech® P/L granular inoculant. Do not use previous Cell-Tech® P/L application rates. Refer to the new Multi-Pulse rate table and product label before application.

Cell-Tech® Multi-Pulse

NEW! Application Rates:

Row spacing	Application rate (lb/ac)	Acres/18 kg bag	Acres/454 kg tote
6 in.	5.5	7.2	182
7 in.	4.7	8.4	213
8 in.	4.1	9.7	244
9 in.	3.6	11	278
10 in.	3.3	12	303
12 in.	2.7	14.7	370
15 in.	2.2	18	455

Packaging:

Pea/Lentil		Granular	1	x	18 kg	=	
		Granular	1	x	454 kg	=	

Notes

JumpStart®

On Seed Applicaton
In-Furrow Applicaton
1 Active
Liquid
Granular
ALL CROPS

Maximize Phosphate, Maximize Yield.

JumpStart® is a leading biological inoculant that enhances phosphate availability in the soil, helping crops maximize phosphorus uptake, root development, and early-season vigour.

- Releases bound inorganic fertilizer phosphate, making it available to crops for better nutrient uptake and growth
- Works in cool soil temperatures to enhance root growth and crop vigour
- Convenient size to add directly to Optimize® FXC DS *Bradyrhizobium* inoculant

Biologicals Actives:

Biological Actives	Function
Penicillium bilaiae (two strains)	Solubilizes inorganic phosphorus

Formulation(s):

Crops	Actives	Type
Barley, canary seed, canola, flax, lentil, mustard, oat, pea, soybean, wheat	*Penicillium bilaiae*	Granular
Alfalfa, sweet clover, canola, chickpea, corn, dry bean, lentil, mustard, pea, soybean, sugar beet, sunflower, wheat	*Penicillium bilaiae*	Liquid

Proof of Performance:

JumpStart® Performance in Irrigated Durum



JumpStart® Granule | Untreated | Competitor

Source: Coaldale, AB

Application:

Liquid Formulation

Rates:

Crop	Container Size (mL)	Volume of Seed Treated (bu)	Water Volume (approx. L)
Wheat	60	40	7.0
	600	400	70
Pea	60	70	6.0
	600	700	60
Chickpea	60	55	4.0
	600	550	40
Dry bean[1]	60	40	3.5
	600	400	35
Lentil	60	40	3.5
	600	400	35
Soybean	60	40 units	2.8
	600	400 units	28
Canola/mustard	60	140 lb	1.5
	600	1400 lb	15
Alfalfa/sweet clover	60	150 lb	1.5
	600	1,500 lb	15
Corn	60	10 units*	2.8
	600	100 units*	28

[1] Use pinto, great northern, black, navy, kidney, red, and pink bean.
* 80,000 kernels per bag (1 unit =1 bag).

Liquid Direction:

- JumpStart® liquid can be used with all nitrogen-fixing rhizobial inoculants
- When applying JumpStart® liquid alone, mix with water and apply to seed within 24 hours
- Planting window on bare seed:
  - Alfalfa/sweet clover is 7 days.
  - Wheat, pea, chickpea, dry bean and lentil is 30 days.
  - Canola, mustard and corn is 60 days.
  - Soybean is 120 days
- JumpStart® liquid can be applied with other seed treatments, but the planting window may be reduced

Granular Formulation

Rates:

Row Spacing	Application Rate	18 kg Bag
	lb/ac	ac/bag
6 in	5.5	7.2
8 in	4.1	9.7
9 in	3.6	11
10 in	3.3	12
12 in	2.7	14.7

Note: The bulk density of JumpStart® granular averages 0.7 g/cm³ (43 lb/ft³).

Granular Directions:

- Applied directly with the seed in the seed row using a granular tank for application
- Application rates vary according to row spacing (refer to table above)
- Pour into tank through a screen
- Fill the tank to match or slightly exceed seed requirements. Do not overfill the tank to avoid compaction.
- Do not auger granule product
- Do not mix granular in the same tank with seed or fertilizer
- Do not leave granular in the tank overnight as condensation can cause lumps to form
- Refer to label before application for complete use instructions

Compatibility:

See page 46 for JumpStart® seed treatment compatibility by formulation and crop.

Packaging:

All Crops

Liquid	5	x	60 ml bottle	=	case	
Liquid	1	x	600 ml bottle	=		
Granular	1	x	18 kg	=		

Nitragin® Gold

On Seed Applicaton | 1 Active | Clay Based

CROPS:
ALFALFA
SWEET CLOVER
CLOVER

More Nitrogen Fixation.

Nitragin® Gold is a convenient and economical inoculant for alfalfa/sweet clover and clover

- Specially selected natural rhizobia strains result in high levels of nitrogen fixation for maximum yield potential
- Micron-sized particles provide optimal seed adhesion and minimal “dusting off”
- Drying system assures customers of high rhizobia levels on the seed

Biologicals Actives:

Product	Biological Actives	Function
Nitragin® Gold alfalfa/sweet clover	*Sinorhizobium meliloti*	Fixes nitrogen
Nitragin® Gold clover	*Rhizobium leguminosarum biovar trifolii*	Fixes nitrogen

Formulation(s):

Clay based

Application:

Crops	Volume of Seed Treated	Product Used
Red clover	19 kg / 5,000 lb	Nitragin® Gold clover
White, ladino, alsike clover	19 kg / 2,500 lb	Nitragin® Gold clover
Alfalfa/sweet clover	19 kg / 5,000 lb	Nitragin® Gold alfalfa/sweet clover

Directions:

- Bulk treatment by the seed processor
- Time on seed for alfalfa/sweet clover is 24 months, and 6 months on clover
- Nitragin® Gold alfalfa/sweet clover is OMRI Listed for organic use. Note: Nitragin® Gold clover is not OMRI Listed.

Compatibility:

See page 54 for Nitragin® Gold compatibility by formulation and crop.

Packaging:

Two products available: Nitragin® Gold clover and Nitragin® Gold alfalfa/sweet clover

Clay Powder 1 x 19 kg =



Optimize® FXC DS

On Seed Applicaton | LCO Signalling Molecule | 2 Actives | Liquid

CROPS: SOYBEAN

Faster Nodulation, Stronger Soybeans, Better Yields.

Optimize® FXC DS is a next-generation inoculant that supports earlier nodule formation, mycorrhizal associations and nitrogen fixation potential in soybeans to enhance consistency across a wide range of environmental conditions.

- Highly effective dual-strain *Bradyrhizobium*
- Contains two different highly effective strains of *Bradyrhizobium*
- Fortified powerful LCO signalling molecule, to initiate nodulation, increase mycorrhizae association and increase consistency across a range of environmental and soil conditions
- Broad compatibility with 120 days on-seed with most seed treatments, and 220 days on-seed with an additional extender
- Retailer applied on-seed liquid formulation

Biologicals Actives:

Biological Actives	Function
Bradyrhizobium japonicum (2 strains)	Fixes nitrogen
LCO (lipo-chitooligosaccharide)	Enhanced and earlier nodulation as well as an increase in association with mycorrhizae

Formulation(s):

Liquid

Application:

Rates:

Package	Content	Volume of Seed Treated	
		Units	lb
Case	Component A (LCO + Extender): 2.01 L jug Component B *(Bradyrhizobia)*: 6.87 L bladder	400	20,000
Box	Component A (LCO + Extender): 2 x 0.201 L jug Component B *(Bradyrhizobia)*: 2 x 0.686 L bladder	80	4,000

Liquid Directions:

- Applied to soybean seed by retailers
- Inoculate seed up to 220 days before seeding with additional Extender (liquid additive), refer to compatibility guide for specific seed treatment details

Optimize® FXC DS

Compatibility:

See page 48 for Optimize® FXC DS seed treatment compatibility.

Packaging:

Soybean	Liquid	Component A (LCO + Extender): 2.01 L jug + Component B (*Bradyrhizobia*): 6.87 L bladder	=	1 case	
	Liquid	Component A (LCO + Extender): 2 x 0.201 L jug + Component B (*Bradyrhizobia*): 2 x 0.686 L bladder	=	5 small boxes packaged in 1 large case	

QuickRoots®

Planter Box
On Seed Applicaton
2 Actives
Wettable Powder
Talc-based

CROPS:
CORN
SOYBEAN, PULSE, SUNFLOWER, SUGAR BEET

Improve Nutrient Availability. Increase Yield Potential.

QuickRoots® SMC is a microbial seed inoculant that helps make important plant nutrients more available to the crop.

- Improves the availability and uptake of nitrogen, phosphate and potassium
- Supports root development and above-ground growth
- Performs across a variety of soil conditions and types
- Increases nutrient availability
- Supports increased yield potential

Biological Actives:

Biological Actives	Function
Bacillus amyloliquefaciens	Makes soil-bound phosphate more available for plant uptake
Trichoderma virens	Supports the uptake of nitrogen, phosphate and potassium

Formulation:

Crop(s)	Actives	Type
Soybean, sugar beet, sunflower, dry bean, chickpea, field pea, lentil	*Bacillus amyloliquefaciens* *Trichoderma virens*	Wettable powder
Corn	*Bacillus amyloliquefaciens* *Trichoderma virens*	Talc-based dry planter-box formulation

Application:

Crop	Application Rate	200 Gram Pouch Treats
Soybean	4 g per 140,000 seeds (unit)	50 units
Sugar beet	8 g per 100,000 seeds (unit)	25 units
Sunflower	30 g per 200,000 seeds (unit)	6.6 units
Dry bean	1 g per 26,000 seeds	5.2 million seeds
Chickpea	1 g per 35,000 seeds	7 million seeds
Field pea	1 g per 60,000 seeds	12 million seeds
Lentil	1 g per 110,000 seeds	22 million seeds
Crop	**Application Rate**	**400 Gram Pouch Treats**
Corn	16 g per 80,000 seeds (unit)	25 seed units

Wettable Powder Directions:

When applying QuickRoots® alone:

- Dilute (mix) with adequate amount of non-chlorinated water
- Mix well and apply uniformly to the seed

When applying QuickRoots® with liquid Rhizobia:

- Mix proper proportions of QuickRoots® and Rhizobia
- Apply proper agitation (directed across the pre-mix tank creating a bubbling action on the far wall) and continuous agitation to avoid settling

Planter Box Directions:

- The provided scoop will measure approximately 16 grams of QuickRoots®
- Refer to the application rates above to determine required amount of QuickRoots® Dry Planter Box for the prescribed amount of seed
- Disperse QuickRoots® Dry Planter Box evenly onto seed. This may be performed as a single batch or in a continuous system using the equipment designed to meter products onto the moving seeds.
- Be sure to coat all seeds uniformly
- Mix well and apply uniformly to seed
- Slurry must be applied to seed within 2 hours

Compatibility:

- Although QuickRoots® is compatible with many fungicide (FST) and/or insecticide (IST) seed treatment products, on-seed and in-tank survival of QuickRoots® may be significantly reduced by using a common tank-mix application method and must be applied within 2 hours
- Do not apply with seed treatment formulations containing high levels of Zinc or Copper. QuickRoots® has not been tested with all possible seed treatment combinations. QuickRoots® remains viable up to 18 months after proper application on seed.

Packaging:

Soybeans/ Multi		Wettable Powder	10	x	200 g	=	
Corn		Talc-based	10	x	400 g	=	

Ratchet®

Foliar Applicaton | LCO Signalling Molecule | 1 Active | Liquid

CROPS:
BARLEY, CANOLA, CORN, FLAX, FORAGES, OAT, POTATO, PULSES, RYE, SOYBEAN SUNFLOWER, WHEAT
(SPRING & WINTER)

More Energy, More Potential.

Ratchet® is a foliar-applied biological molecule that activates genes within the plant to support key plant processes that help drive yield.

Formulated for ease of use and compatibility with in crop spray applications.

Key Benefits:

Foliar-applied LCO signalling molecule helps activate physiological responses that:

- Increase photosynthetic efficiency and carbohydrate production to fuel plant growth
- Supports reproductive development and yield potential – flowering, grain fill and overall crop performance
- Support stress resilience by helping plants maintain productivity during periods of heat, drought and other environmental (abiotic) stresses
- Easy-to-use water soluble liquid formulation for in-tank compatibility with a wide range of crop nutrition and crop protection products.

Biological Active	Function
LCO (lipo-chitooligosaccharide) technology	Applied as a foliar treatment, LCO signalling molecule enhances photosynthetic activity, carbohydrate production, plant stress response and supports improved yield.

Application Info:

Timing: During active vegetative growth through early reproductive development, coinciding with typical herbicide and/or fungicide timing.

Application: Ground or aerial

Repeat application: For split applications, make a second application 14 days after the initial treatment.

Tank-mix Compatibility:

When tank-mixing, follow the most restrictive label limitations and precautions of all products in the mixture.

Packaging & Application Rates:

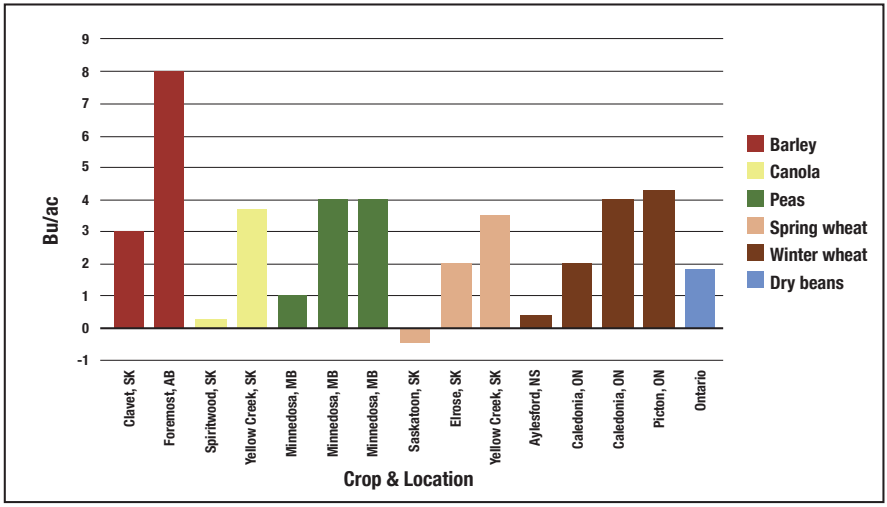
Packaging: 2 × 9.5 L jug

Application rate: 120 mL/ac (80 ac/jug) or 60 mL/ac for split applications (max 2 applications)

Ground application water volume: 38–76 L/ac (10–20 gal/ac)

Formulation: Liquid

Trial data:



Ratchet® yield increase over the untreated check (bu/ac); grower trials (n = 15). Average increase: 2.7 bu/ac
Individual results may vary depending on crop, environment and management practices.

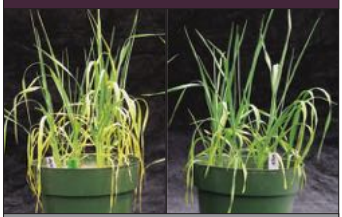
Ratchet® increases kernel development and consistency, enhancing crop maturity and reducing the drying time needed at harvest.

Ratchet® Performance in Corn



Source: Winkler, MB 2025

Ratchet® Drought Performance



Source: FMC Stine Research Center, 2026

Ratchet® helps plants better withstand abiotic stress under drought conditions.

Ratchet® increased above-ground biomass and achieved a 4 bu/ac yield increase compared to untreated check.

Ratchet® Performance in Pea



Source: Minnedosa, MB 2025

TagTeam®

In-Furrow Applicaton
On Seed Applicaton
2 Actives
Granular
Liquid
CROPS: LENTIL PEA SOYBEAN

More Phosphate. More Nitrogen. More Potential.

TagTeam® inoculant is a dual-action biological solution that optimizes nutrient availability to unlock your crop's full yield potential.

- Improves phosphate availability and nitrogen fixation, helping crops grow stronger and healthier
- Augments nodule formulation, increasing nitrogen fixation
- Synergy between rhizobia and *P. bilaiae*, as a result of more phosphorus being taken up by the plant to meet the heavy P requirement for the N fixation process
- TagTeam® Soybean is available with improved granular formulation for superior handling and flowability

Biologicals Actives:

Biological Actives	Function
Rhizobium leguminosarum or *Mesorhizobium ciceri* or *Bradyrhizobium japonicum*	Fixes nitrogen
Penicillium bilaiae	Solubilizes inorganic phosphorus

Formulation(s):

Crops	Actives	Type
Pea, lentil	*Penicillium bilaiae + Rhizobium leguminosarum*	Liquid
Soybean	*Penicillium bilaiae + Bradyrhizobium japonicum*	Improved Granular

Application:

Liquid Formulation

Rates:

Crop	Size	Volume of Seed Treated
Pea, lentil	3.0 L + 57 g WP	40 bu

Liquid Instructions:

- Pour the wettable powder directly into the liquid bladder. Mix well.
- Once mixed in bladder the liquid must be applied to the seed within 24 hours
- Apply directly to the seed at a rate of 278 ml/100 kg of seed
- Planting window on bare lentil and pea seed is 48 hours

Improved Granular Formulation

Rates:

Row Spacing	Application Rate	16.5 kg bag
	lb/acre	acre/bag
7 in	6.2	5.9
8 in	5.4	6.7
9 in	4.7	7.7
10 in	4.3	8.4
12 in	3.6	10.1
15 in	2.9	12.6
24 in	1.8	20.2
30 in	1.4	25.9

Note: The bulk density of TagTeam® granular is approximately 35 lb/ft³

Improved Granular Directions:

- Applied directly with the seed in the seed row using a granular tank for application
- Application rates vary according to row spacing (refer to table above)
- Pour into tank through a screen
- Fill the tank to match or slightly exceed seed requirements. Do not overfill the tank to avoid compaction.
- Do not auger granules
- Do not mix granular in the same tank with seed or fertilizer
- Do not leave granular in the tank overnight as condensation can cause lumps to form
- Refer to label before application for complete use instructions

Compatibility:

See page 51 for TagTeam® seed treatment compatibility by crop.

Packaging:

Pea/Lentil — Liquid — (4 x 3 L bladder) + (4 x 57 g WP bottle) =



Soybean — Improved Granular — (1 x 16.5 kg bags) =



TagTeam® BioniQ®

In-Furrow Applicaton
On Seed Applicaton
LCO Signalling Molecule
4-5 Actives
Improved Granular
Peat

CROPS:
CHICKPEA
FABA BEAN
LENTIL
PEA

More Nodules. More Nutrients. More Yield.

TagTeam® BioniQ® is a next-generation granular inoculant that helps pulse crops grow stronger and yield more by unlocking essential nutrients in the soil.

- Improved granular formulation for superior handling and flowability
- Four living biologicals in one product that improves nitrogen fixation, and availability of phosphorus and other key nutrients
- Performs in both warm and cool soil conditions
- Faster nodulation and increased mycorrhizae associations in pea and lentil crops due to LCO signalling molecule regardless of environmental conditions

Biologicals Actives:

Biological Actives	Function
Rhizobium leguminosarum or *Mesorhizobium ciceri*	Fixes nitrogen
Penicillium bilaiae (2 strains)	Solubilizes inorganic phosphorus in both warm and cool soil conditions
Bacillus amyloliquefaciens	Increases availability and uptake of nitrogen, phosphorus and potassium
Trichoderma virens	
LCO (lipo-chitooligosaccharide) technology	Signalling molecule between rhizobia and plant allowing for enhanced and earlier nodulation Increases association with indigenous mycorrhizae

Formulation(s):

Crops	Actives	Type
Pea, lentil	*Rhizobium leguminosarum + Penicillium bilaiae + Bacillus amyloliquefaciens + Trichoderma virens + LCO*	Improved Granular
Pea, lentil	*Rhizobium leguminosarum + Penicillium bilaiae + Bacillus amyloliquefaciens + Trichoderma virens*	Peat
Chickpea	*Penicillium bilaiae + Mesorhizobium ciceri + Bacillus amyloliquefaciens + Trichoderma virens*	Peat
Chickpea	*Rhizobium leguminosarum + Penicillium bilaiae + Bacillus amyloliquefaciens + Trichoderma virens*	Improved Granular
Faba bean	*Rhizobium leguminosarum + Penicillium bilaiae + Bacillus amyloliquefaciens + Trichoderma virens*	Improved Granular

Application:

Peat Formulation

Rates:

Crop	Volume of Seed Treated per 2.2 kg bag (bu)	Slurry Water Rate* (L)
Chickpea	50	4.0
Lentil	30	2.5
Pea	50	4.0

*Approximate water volume for peat slurry application.

Peat Directions:

- Mix peat with cool, clean water and apply to seed as a slurry (refer to above table)
- Can be applied up to 48 hours before seeding pea, lentil and chickpea, and can be used with many different seed treatments (see chart on page 00 for guidelines)

Peat Seed Treatment – Dry vs. Slurry



Dry Slurry

Compatibility:

See page 52 for TagTeam® BioniQ® seed treatment compatibility by crop.

Improved Granular Formulation

Rates:

Row Spacing	Pea, Lentil, Faba Bean and Chickpea		
	Application Rate	16.5 kg bag	454 kg tote
	lb/acre	acre/bag	acre/tote
6 in	5.5	6.6	182
7 in	4.7	7.7	213
8 in	4.1	8.9	244
9 in	3.6	10.1	278
10 in	3.3	11	303
12 in	2.7	13.4	370
15 in	2.2	16.5	455

Bulk density 35 lb/ft^3

TagTeam® BioniQ®

Improved Granular Directions:

- Applied directly with the seed in the seed row using a granular tank for application
- Application rates vary according to row spacing (refer to table above)
- Pour into tank through a screen
- Fill the tank to match or slightly exceed seed requirements. Do not overfill the tank to avoid compaction.
- Do not auger
- Do not mix granules in the same tank with seed or fertilizer
- Do not leave granules in the tank overnight as condensation can cause lumps to form
- Refer to label before application for complete use instructions

Packaging:

Chickpea		Peat	7	x	2.2 kg bags	=	
Pea/lentil		Peat	7	x	2.2 kg bags	=	
Chickpea		Improved Granular	1	x	16.5 kg	=	
		Improved Granular	1	x	454 kg	=	
Faba bean		Improved Granular	1	x	16.5 kg	=	
Pea/lentil		Improved Granular	1	x	16.5 kg	=	
		Improved Granular	1	x	454 kg	=	

Proof of Performance:

TagTeam® BioniQ® IG Promotes Faster Nodulation for Early Uniform Growth @ 16 days



TagTeam® BioniQ® IG | Untreated

Source: Minnedosa, MB. Seeded May 6, 2025. Photo taken May 22, 2025

Improved Granular Formulation

The improved granular formulation of TagTeam® BioniQ® features granules with 9% greater hardness, 10% better flow than crumble granules, and a significant reduction in dust.

Hardness

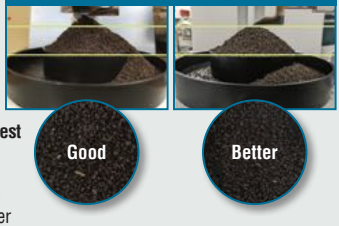
Peat particles bond together within the granule through APT's proprietary polymerization process, resulting in high crush strength.



Resistance to attrition test
- Simulates movement and vibration
- Measures particle size change before and after

Results:
Improved granule product has a **9% increase** in granular hardness.

Flowability



Results:
Flowability improved by **greater than 10%**.

Benefit: A lower angle of repose can lead to easier and more complete filling of tanks.

Dust Level



Results:
Improved granular product shows little to no dust in the Dustiness Assay test.

Notes

BIOLOGICALS
by
FMC

Compatibility

Inoculant Seed Treatment Compatibility..... 39
BioniQ® Compatibility 40
Cell-Tech® Compatibility..... 43
Cell-Tech® DS Compatibility 45
JumpStart® Compatibility..... 46
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Scan to visit the 2027
digital product guide

Notes

Inoculant Seed Treatment Compatibility

How Compatibility Testing Works

Seed treatment compatibility tests are conducted by Novonesis to ensure that inoculants remain effective when used alongside registered pesticide seed treatments.

Each inoculant is tested with different seed treatments using a variety of application methods across specific crops.

Application Methods

Sequential Application

- Apply the pesticide seed treatment first. Let it dry completely before applying the inoculant

Simultaneous Application

- Apply both the pesticide seed treatment and inoculant at the same time but use separate applicators

Tank-Mix Application

A tank-mix refers to the practice of adding the inoculant directly into another product (pesticide, fertilizer, biological) in the tank together and making a single application whether it is on the seed or in the field.

Timing Matters:

Follow the product labels for how long the tank-mix can sit before being applied to seed.

Planting window recommendations can be found in each individual product section of this guide.



Compatibility*:

Canola Planting Window

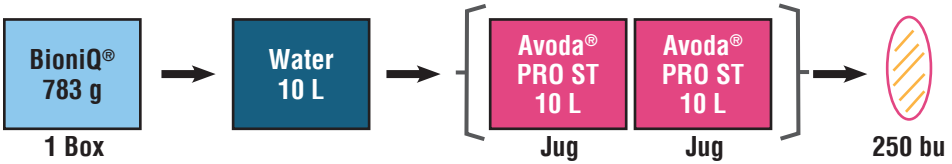
Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application
Helix® Saltro®	60 days	•	•
Helix® Saltro® + Buteo™	60 days	•	•
Helix® Saltro® + Fortenza® Advanced	60 days	•	•
Helix® Vibrance®	60 days	•	•
Helix® Vibrance® + Buteo™	60 days	•	•
Helix® Vibrance® + Fortenza®	60 days	•	•
Helix® Vibrance® + Lumiderm®	60 days	•	•
Helix® Vibrance® + Buteo™ + Lumiposa™	60 days	•	•
LumiGEN®	60 days	•	•
Prosper® EverGol®	60 days	•	•
Prosper® EverGol® + Buteo™	30 days	•	•
Prosper® EverGol® + Fortenza®	60 days	•	•
Prosper® EverGol® + Lumiderm®	60 days	•	•
Visivio™	60 days	•	•
Visivio™ + Buteo™	30 days	•	•
Visivio™ + Fortenza®	60 days	•	•
Visivio™ + Lumiderm®	60 days	•	•
Modalex™ 600	60 days	•	•
Modalex™ 600 + Buteo™ Start	60 days	•	•
Modalex™ 600 + Lumiderm®	60 days	•	•
Modalex™ 600+ Lumiposa™ + Buteo™ Start	60 days	•	•
Modalex™ 600 + Vibrance® Flexi + Buteo™ Start	60 days	•	•
Prosper® EverGol® + Buteo™ Start	60 days	•	•
Lumiderm® Oniq	60 days	•	•

New Wheat Tank-Mix Water Rates: 30 L water rate minus synthetic seed treatment needed for 250 bu seed

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]	Water needed* for 1 unit of BioniQ® for 250 bu	Seed Treatment needed for 250 bu	Tank-mix amount applied per 100 kg seed
Bare seed	60 days	60 days	60 days	30 L	.	440 ml
Avoda® PRO	60 days	60 days	60 days	7.9 L	22.1 L	440 ml
Cruiser® Vibrance® Quattro	60 days	60 days	TBD	7.9 L	22.1 L	440 ml
Equento®	60 days	60 days	60 days	24.9 L	5.1 L	440 ml
Equento® Cereal (Equento® + Cruiser® Vibrance® Quattro)	60 days	60 days	TBD	2.8 L	27.2 L	440 ml
Rancona® Trio	60 days	60 days	30 days	9.5 L	20.5 L	440 ml
Raxil® Pro	60 days	60 days	30 days	7.9 L	22.1 L	440 ml
Raxil® Pro Shield	60 days	60 days	30 days	4.4 L	25.6 L	440 ml
Raxil® Rise	30 days	30 days	30 days	7.9 L	22.1 L	440 ml
Raxil® Rise + Stress Shield	30 days	30 days	30 days	4.4 L	25.6 L	440 ml

*Please check product label for complete information.

Simplified Avoda® PRO seed treatment tank-mix wheat example:



Wheat Planting Window: 42 L water rate minus synthetic seed treatment for 250 bu seed

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
EverGol® Energy	60 days	60 days	60 days
Insure® Cereal FX4	60 days	60 days	60 days
Lumivia™ CPL	60 days	60 days	60 days
NipsIT™ SUITE	10 days	10 days	Not Recommended
Straxan™	60 days	60 days	60 days
Terraxa™ F4	60 days	60 days	Not Recommended
Vibrance® Quattro	60 days	60 days	60 days
Vitaflo® 280	Not Recommended	Not Recommended	Not Recommended

Barley and Oat Planting Window:

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Cruiser® Vibrance® Quattro	60 days	60 days	60 days
EverGol® Energy	60 days	60 days	60 days
Insure® Cereal FX4	60 days	60 days	60 days
NipsIT™ SUITE	10 days	10 days	Not Recommended
Rancona® Trio	60 days	60 days	30 days
Raxil® PRO Shield	60 days	60 days	30 days

[1] Inoculant was tank-mixed with the seed treatment for four hours prior to applying to the seed. Consult the seed treatment manufacturers' label for proper rates of seed treatments.

• Indicates not tested

*Please check product label for complete information.

Compatibility*:

Soybean Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Acceleron® Seed Applied Solutions STANDARD**	4 days	4 days	•
Cruiser Maxx® Vibrance® Beans	4 days	4 days	•
EverGol® Energy[2]	4 days	4 days	•
EverGol® Energy[2] + Stress Shield® (104 ml low rate)	4 days	4 days	•
Fortenza® + Vayantis® IV	4 days	4 days	•
ILeVO®	4 days	4 days	•
Intego™ Solo	4 days	4 days	•
Lumiderm®	4 days	4 days	•
Lumisena®	4 days	4 days	•
Rancona® Trio	24 hours	24 hours	•
Trilex® AL	4 days	4 days	•
Trilex® EverGol®	4 days	4 days	•
Vayantis® IV	4 days	4 days	•
Vayantis® IV + Cruiser® 5FS	4 days	4 days	•
Vayantis® IV RFC	4 days	4 days	•
Vibrance® Maxx RFC	4 days	4 days	•

Pea & Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Allegiance® FL	48 hours Lentil 24 hours Pea	24 hours Lentil 12 hours Pea	•
Apron Maxx®	48 hours Pea	24 hours Pea	24 hours Pea
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
EverGol® Energy	24 hours	24 hours	•
EverGol® Energy + Stress Shield® 600	24 hours Pea 6 hour Lentil	24 hours Pea 6 hour Lentil	•
EverGol® Rise	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (104 ml)	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (208 ml)	6 hours Pea	6 hours Pea	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo + Apron Maxx® Peas	48 hours	48 hours	•
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
Lumivia™ CPL	48 hours	48 hours	•

Pea & Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Rancona® Trio	6 hours	2 hours	•
Stress Shield® 600 + Pro-Ized® Blue Colourant (high rate)	•	24 hours Lentil 6 hours Pea	Not Recommended
Trilex® EverGol®	48 hours	48 hours	48 hours
Trilex® EverGol® Shield (104 ml rate)	48 hours Lentils 24 hours Pea	48 hours Lentils 24 hours Pea	Not Recommended
Vibrance® Maxx	48 hours	48 hours	48 hours
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Maxx RFC+ Intego™ Solo	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•

Soybean Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Cruiser Maxx® Vibrance® Beans	2 days	2 days	•
EverGol® Energy	2 days	2 days	•
EverGol® Energy + Stress Shield® 600	2 days	2 days	•
Fortenza® + Vayantis® IV	No Data	No Data	No Data
Lumiderm®	2 days	2 days	•
Lumisena®	2 days	2 days	•
Rancona® Trio	24 hours	24 hours	•
Stress Shield® 600	2 days	2 days	•
Trilex® EverGol®	2 days	2 days	•
Vayantis® IV	No Data	No Data	No Data
Vayantis® IV + Cruiser® 5FS	No Data	No Data	No Data
Vayantis® IV RFC	No Data	No Data	No Data
Vibrance® Maxx RFC	2 days	2 days	•
Vibrance® Maxx RFC + Cruiser® 50 g	2 days	2 days	•

Consult the seed treatment manufacturers label for proper rates of seed treatments.
[1] Cell-Tech® was tank-mixed with the seed treatment for four hours prior to applying to the seed.
[2] Tested with colourant and without PSF 1010.
• Indicates not tested
** Acceleron® Seed Applied Solutions STANDARD for soybeans (fungicides and insecticide) is a combination of four separate individually registered products, which together contain the active ingredients Penflufen, Prothioconazole, Metalaxyl, flupyradifurone, and tetraniliprole (East) or Penflufen, Prothioconazole, Metalaxyl and imidacloprid (West).

Planting Window for Peat Formulation on Bare Seed: 48 hours before seeding lentil, chickpea, soybean.
Planting Window for Liquid Formulation on Bare Seed: 4 days before soybean

*Please check product label for complete information.

Compatibility*:

Pea & Lentil Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Allegiance® FL	Not Recommended	Not Recommended	Not Recommended
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	Not Recommended
EverGol® Energy	•	6 hours	•
EverGol® Energy + Stress Shield®	•	Not Recommended	•
EverGol® Rise	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (104 ml)	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (208 ml)	6 hours Pea	6 hours Pea	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo + Apron Maxx® Peas	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	Not Recommended	Not Recommended	Not Recommended
Lumivia™ CPL	48 hours	48 hours	24 hours
Lumivia™ CPL + Trilex® EverGol®	24 hours	24 hours	•
Rancona® Trio	Not Recommended	6 hours	Not Recommended
Stress Shield® 600 + Pro-Ized® Blue Colourant (high rate)	•	24 hours	Not Recommended
Trilex® EverGol®	24 hours	24 hours	Not Recommended
Trilex® EverGol® Shield (104 ml rate)	Not Recommended	Not Recommended	Not Recommended
Vibrance® Maxx	24 hours Lentil 48 hours Pea	24 hours Lentil 48 hours Pea	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Maxx RFC+ Intego™ Solo	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•

Planting Window for Liquid Formulation on Bare Seed: 5 days with Cell-Tech® DS.

Compatibility*:

Liquid Formulation

Canola and Mustard Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Acceleron® Seed Applied Solutions for canola**	30 days	•	•
Helix® Vibrance®	30 days	•	•
Helix® Vibrance® + Fortenza®	30 days	•	•
Prosper® EverGol®	30 days	•	•

Pea & Lentil Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Allegiance® FL	30 days Pea	30 days Pea	•
Apron Maxx® Peas	15 days Pea	15 days Pea	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Lumivia™ CPL	30 days	30 days	30 days
Lumivia™ CPL + Rancona® Trio	30 days	30 days	•
Lumivia™ CPL + Trilex® EverGol®	30 days	30 days	•
Rancona® Trio	30 days	30 days	7 days
Trilex® EverGol®	30 days	30 days	30 days Pea 15 days Lentil
Trilex® EverGol® + Stress Shield® 600 (208 ml/100 kg)	30 days	30 days	Not Recommended

Soybean Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Cruiser Maxx® Vibrance® Beans	120 days	120 days	30 days
EverGol® Energy[2]	120 days	120 days	30 days
EverGol® Energy[2] with Stress Shield® 600 (104 ml rate)	120 days	120 days	Not Recommended
Insure® Pulse	•	30 days	•

Wheat Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Avoda® PRO Seed Treatment (FMC)	30 days	30 days	30 days
Cruiser® Vibrance® Quattro	30 days	30 days	30 days
EverGol® Energy[2]	30 days	30 days	30 days
Insure® Cereal	30 days	30 days	30 days
NipsIT™ SUITE	30 days	30 days	•
Rancona® Trio	30 days	30 days	30 days
Raxil® PRO	30 days	30 days	30 days
Raxil® PRO Shield (co-pack)	30 days	30 days	30 days
Vibrance® Quattro	30 days	30 days	30 days

Consult the seed treatment manufacturers' label for proper rates of seed treatments.
[1] JumpStart® was tank-mixed with the seed treatment for four hours prior to applying to the seed.
[2] Tested with colourant and without PSF 1010.
• Indicates not tested.
**Acceleron® Seed Applied Solutions for canola contains the active ingredients difenoconazole, metalaxyl (M and S isomers), fludioxonil and thiamethoxam.

Planting Window for Liquid Formulation on Bare Seed:
– Alfalfa/sweet clover is 7 days.
– Wheat, pea, chickpea, dry bean and lentil is 30 days.
– Canola, mustard and corn is 60 days.
– Soybean is 120 days.

*Please check product label for complete information.

Optimize® FXC DS

Compatibility* :

Liquid Formulation

Seed Treatment	Sequential Application	Simultaneous Application	When using additional liquid additive (extender)[1]	
			Sequential Application	Simultaneous Application
Acceleron® Seed Applied Solutions BASIC**	120 days	120 days	•	220 days
Acceleron® Seed Applied Solutions STANDARD*	120 days	120 days	220 days	220 days
Acceleron® Seed Applied Solutions STANDARD* + ILeVO®	120 days	120 days	220 days	220 days
Acceleron® Seed Applied Solutions STANDARD* + Saltro®	120 days	120 days	220 days	220 days
Apron XL® + Vibrance® Maxx RFC	•	•	•	220 days
Apron XL® + Cruiser Maxx® Vibrance Beans	•	•	•	220 days
Apron XL® + Fortenza® Vibrance® Maxx	•	120 days	•	220 days
Cruiser Maxx® Vibrance® Beans	120 days	120 days	•	220 days
Cruiser Maxx® Vibrance® Beans + Apron XL® + Saltro®	120 days	120 days	220 days	220 days
Cruiser Maxx® Vibrance® Beans + Apron XL® + Vayantis®	120 days	120 days	220 days	220 days
Draco™	•	120 days	•	220 days
Draco™ + Cruiser® 5FS + Vibrance® Trio + Vayantis® + Saltro®	•	120 days	•	220 days
Draco™ + Fortenza® + Vibrance® Trio + Vayantis® + Saltro®	•	120 days	•	220 days
EverGol® Energy[2]	120 days	120 days	•	220 days
EverGol® Energy[2] + ILeVO®	120 days	90 days	220 days	220 days
EverGol® Rise	120 days	120 days	220 days	220 days
EverGol® Rise + Acceleron	120 days	120 days	220 days	220 days
EverGol® Rise + Stress Shield®	120 days	120 days	220 days	220 days
EverGol® Energy[2] + Stress Shield® 600 (104 ml low rate)	120 days	120 days	•	220 days

Optimize® FXC DS

Liquid Formulation

Seed Treatment	Sequential Application	Simultaneous Application	When using additional liquid additive (extender)[1]	
			Sequential Application	Simultaneous Application
Fortenza®	•	120 days	•	220 days
Fortenza® + Acceleron® Seed Applied Solutions BASIC*	•	120 days	•	220 days
Fortenza® + Saltro® + Lumisena™ + Vayantis® IV	120 days	120 days	220 days	220 days
Fortenza® + Saltro® + Vayantis® IV	120 days	120 days	•	220 days
Fortenza® + Vayantis® IV	•	120 days	220 days	220 days
Fortenza® + Vibrance® Maxx RFC	•	120 days	•	220 days
Fortenza® + Vibrance® Maxx RFC + Apron XL®	120 days	120 days	•	220 days
Fortenza® + Vibrance® Maxx RFC + Apron XL® + Saltro®	120 days	120 days	220 days	220 days
Fortenza® + Vibrance® Maxx RFC + Apron XL® + Vayantis®	120 days	120 days	220 days	220 days
Fortenza® + Vibrance® Maxx RFC + Apron XL® + Vayantis® + Saltro®	120 days	120 days	220 days	220 days
ILeVO®	60 days	60 days	220 days	220 days
Insure® Pulse	•	30 days	220 days	220 days
Integral®	90 days	90 days	•	220 days
JumpStart® liquid	120 days	120 days	220 days	220 days
JumpStart® liquid + Fortenza® + Vayantis® IV	120 days	120 days	220 days	220 days
JumpStart® liquid + Victrato® 2	120 days	120 days	220 days	220 days
Lumiderm®	120 days	120 days	•	60 days
Lumisena™	120 days	120 days	220 days	220 days
Rancona® Trio	120 days	120 days	220 days	220 days
Vayantis® IV	120 days	120 days	220 days	220 days
Vayantis® IV + Cruiser® 5FS	120 days	120 days	220 days	220 days
Vayantis® IV RFC	120 days	120 days	220 days	220 days
Vibrance® Maxx RFC	120 days	120 days	220 days	220 days
Vibrance® Maxx RFC + Apron XL® + Vayantis®	•	120 days	•	220 days

Optimize® FXC DS

Seed Treatment	Sequential Application	Simultaneous Application	When using additional liquid additive (extender)[1]	
			Sequential Application	Simultaneous Application
Victrato® 2	120 days	120 days	220 days	220 days
Victrato® Complete	120 days	120 days	220 days	220 days
Victrato® Complete + Fortenza®	120 days	120 days	220 days	220 days

• Indicates not tested

[1] Additional liquid extender purchased separately.

[2] Tested with colourant and without PSF 1010.

**Acceleron® Seed Applied Solutions BASIC for soybeans (fungicides only) is a combination of two separate individually registered products, which together contain the active ingredients Penflufen, Prothioconazole, and Metalaxyl.

Acceleron® Seed Applied Solutions STANDARD for soybeans (fungicides and insecticide) is a combination of four separate individually registered products, which together contain the active ingredients Penflufen, Prothioconazole, Metalaxyl, flupyradifurone, and tetraniliprole (East) or Penflufen, Prothioconazole, Metalaxyl and imidacloprid (West).

Bare Seed: Inoculate bare seed up to 220 days before seeding.

*Please check product label for complete information.

Compatibility*:

Liquid Formulation

Pea & Lentil Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	Not Recommended
EverGol® Energy	•	6 hours	•
EverGol® Energy + Stress Shield®	•	Not Recommended	•
EverGol® Rise	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (104 ml)	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (208 ml)	6 hours Pea only	6 hours Pea only	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	Not Recommended	Not Recommended	Not Recommended
Lumivia™ CPL	48 hours	48 hours	24 hours
Lumivia™ CPL + Trilex® EverGol®	24 hours	24 hours	•
Rancona® Trio	Not Recommended	Not Recommended	Not Recommended
Stress Shield® 600 + Pro-Ized® Blue Colourant (104 ml + 20 ml rate)	•	24 hours Lentil 6 hours Pea	Not Recommended
Trilex® EverGol®	Not Recommended	Not Recommended	Not Recommended
Trilex® EverGol® Shield (104 ml rate)	Not Recommended	Not Recommended	Not Recommended
Vibrance® Maxx	24 hours Lentil 48 hours Pea	24 hours Lentil 48 hours Pea	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance Maxx RFC+ Intego™ Solo	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•

*Please check product label for complete information.

Compatibility*:

Peat Formulation

Pea & Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Allegiance® FL	48 hours	48 hours	6 hours
Belmont 2.7FS	48 hours	48 hours	•
Belmont 2.7FS + Rancona® Trio	48 hours	•	•
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
EverGol® Energy	48 hours	48 hours	•
EverGol® Energy + Stress Shield®	24 hours Pea 6 hours Lentil	24 hours Pea 6 hours Lentil	•
EverGol® Rise	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (104 ml)	48 hours	48 hours	•
EverGol® Rise + Stress Shield® (208 ml)	6 hours	6 hours	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo	48 hours	48 hours	Not Recommended
Intego™ Solo + Apron Maxx® Peas	48 hours Pea	48 hours Pea	48 hours Pea
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	48 hours
Intego™ Solo + Trilex® EverGol®	48 hours	48 hours	48 hours Pea Not recommended Lentil
Lumivia™ CPL	48 hours	48 hours	•
Lumivia™ CPL + Trilex® EverGol®	24 hours	24 hours	•
Rancona® Trio	2 hours	2 hours	•
Stress Shield®	48 hours	48 hours	•
Trilex® EverGol®	48 hours	48 hours	•
Trilex® EverGol® + Stress Shield®	24 hours	24 hours	•
Vibrance® Maxx	48 hours	48 hours	48 hours
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Maxx + Intego™ Solo	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•

Chickpea Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application[1]
Allegiance® FL	6 hours	6 hours	•
Apron® Advance	6 hours	6 hours	•
Belmont 2.7FS	24 hours	24 hours	•
Cruiser® 5FS + Vibrance® Maxx	6 hours	48 hours	•
EverGol® Energy	6 hours	6 hours	•
Insure® Pulse	6 hours	6 hours	6 hours
Intego™ Solo	6 hours	6 hours	Not Recommended
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	6 hours	6 hours	Not Recommended
Rancona® Trio	6 hours	6 hours	•
Stress Shield®	6 hours	6 hours	•
Trilex EverGol®	6 hours	6 hours	•
Trilex EverGol® + Stress Shield®	6 hours	6 hours	•
Vibrance® Maxx RFC	6 hours	6 hours	•
Vibrance® Total	6 hours	6 hours	•

Consult the seed treatment manufacturers' label for proper rates of seed treatments.
[1] TagTeam® was tank-mixed with the seed treatment for four hours prior to applying to the seed.
• Indicates not tested.

Planting Window for Lentil & Pea on Bare Seed:
– 48 hours before seeding (peat and liquid)

Planting Window for Chickpea on Bare Seed:
– 48 hours before seeding peat, 48 hours before seeding liquid

*Please check product label for complete information.

Nitragin® Gold

Planting Window (clay powder)

Product	Bare Seed
Nitragin® Gold alfalfa/sweet clover	24 months
Nitragin® Gold clover	6 months

Notes

Notes

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Notes

Double Inoculants In Soybeans: When It Makes Sense

Soybeans have a tremendous demand for nitrogen. Like other legumes, soybeans have the unique ability to form a symbiotic relationship with nitrogen-fixing bacteria, primarily *Bradyrhizobium japonicum*, colonize the plant's roots and help form nodules that turn atmospheric nitrogen (N_2) into ammonium (NH_4^+), a form plants can use to grow and thrive.

In many Canadian growing regions – particularly western Canada, these soybean-specific *Bradyrhizobium* bacteria are not naturally present, making inoculation an important part of establishing a productive crop.

For growers, the question is often not whether to inoculate, but whether double inoculation is worth the additional cost. Double inoculation typically means delivering rhizobia through two application methods, such as a liquid or peat inoculant on the seed in combination with a granular or liquid inoculant in-furrow. The objective is to increase the number of viable bacteria introduced into the field and provide multiple opportunities for the developing roots to encounter them.

Inoculant Types

- **Peat-based or liquid inoculants:** Applied on the seed, making early contact with the main root.
- **Granular inoculants:** Placed in the furrow at planting. These place rhizobia within the planting furrow and encourage nodules to form on both main and lateral roots.

Why Adding Rhizobia Matters Year Over Year

Our soils do not contain native *Bradyrhizobium* and thus soybeans rely on the introduction of commercial inoculants in order for the plants to fix nitrogen. Field history is important, fields without a history of soybeans are the clearest situation for double inoculation. Studies have shown that introduced populations decline over time and have a rapid rate of genetic transformations in the soil. Bottom line is that the commercial inoculant that was researched to have the best *Bradyrhizobium* strain will no longer be the same in a few short years due to the rhizobia mutating. Nodules may form but they may not be effective or efficient at fixing nitrogen. This is why it is recommended to use a commercial inoculant every year with your soybean crop.

Benefits of Successful Nodulation

- Better nitrogen uptake means stronger growth and more pods
- Higher yield potential and improved protein levels



Double Inoculants In Soybeans: When It Makes Sense



When to Double Inoculate and Why

Using two inoculant formulation types boosts the odds of good nodulation, especially when conditions are tough (dry weather, sandy soils, or if you're planting soybeans for the first time). Rhizobia added to the soil needs to multiply 8x in order to get to populations for successful nodulation, the more viable, effective organisms added increases maximizing N fixation capabilities of the plant.

- New soybean fields
- Long breaks between soybean crops (4+ years)
- After flood or drought: Harsh conditions hurt soil microbe survival

Yield Advantage

- Fields planted to soybeans for the first time can see a +24% yield bump (about 7.4 bu/ac) when double inoculated[1]

Best Practices

- Granular products tend to do better in dry or stressed soils when compared to peat and liquid formulations under the same conditions
- Work with your agronomist to make the right call for your fields

1 Indian Head Agricultural Research Foundation (IHARF). Inoculant Options for Pulse Crops. Available at: https://saskpulse.com/resources/inoculant-options-for-pulse-crops/

NEW Phosphate Availability in Crop Production

Phosphate is essential for plant health, particularly for crops that rely on biological nitrogen fixation like lentils and peas. However, phosphate availability is often limited due to soil fixation and its immobility.

Factors Limiting Phosphate Availability

Phosphate availability in soil can be restricted by:

- High levels of calcium, magnesium, iron or aluminum that bind phosphate
- High clay content
- Cold or dry soils that reduce microbial activity and root uptake

Even when applied, up to 90% of phosphate fertilizer can be bound in soil in the year of application, with at least 25% never becoming available to the plant.

Why Phosphate Matters

Phosphate supports:

- Energy transfer from photosynthesis to roots
- Root development and early plant vigour
- Nodule formation and nitrogen fixation in legumes
- Early and even maturity across crop types

Phosphate and Nitrogen Fixation

For pulse crops, phosphate is critical in enabling nodulation and nitrogen fixation:

- Energy source used in the nitrogen fixation process
- Supports nodulation and the development of larger, more active nodules
- Without adequate phosphate, nitrogen fixation and yield are compromised

Role of *Penicillium bilaiae* and Biological Inoculants

***Penicillium bilaiae* is a beneficial soil fungus that enhances phosphate uptake by:**

- Solubilizing bound phosphate with the production of organic acids
- Working under a wide range of pH and soil temperatures
- Increasing root hairs and shoot growth

Products like BioniQ®, TagTeam®, TagTeam® BioniQ® and JumpStart® use *Penicillium bilaiae* to increase phosphate availability throughout the season. These products are especially helpful in cold soils or when low rates of phosphate are used due to crop sensitivity when fertilizer is placed with the seed.

Other biologicals like *Bacillus amyloliquefaciens* and *Trichoderma virens* also contribute by improving nutrient availability and promoting plant growth.

Phosphate Availability in Crop Production

Crop-Specific Considerations

Canola

- Needs phosphate within a week of germination
- Sensitive to high seed-placed rates of fertilizer (maximum amount with seed 25 lb P_2O_5/ac)
- BioniQ® improves early phosphate access, uniformity, and pod formation

Peas and Lentils

- Lentils require 22–27 lb. P_2O_5/ac for a 30 bu/ac crop
- Peas require 38-46 lb P/ac for a 50 bu crop[1]
- Sensitive to seed-placed fertilizer; biologicals support early vigour and nitrogen fixation

Wheat

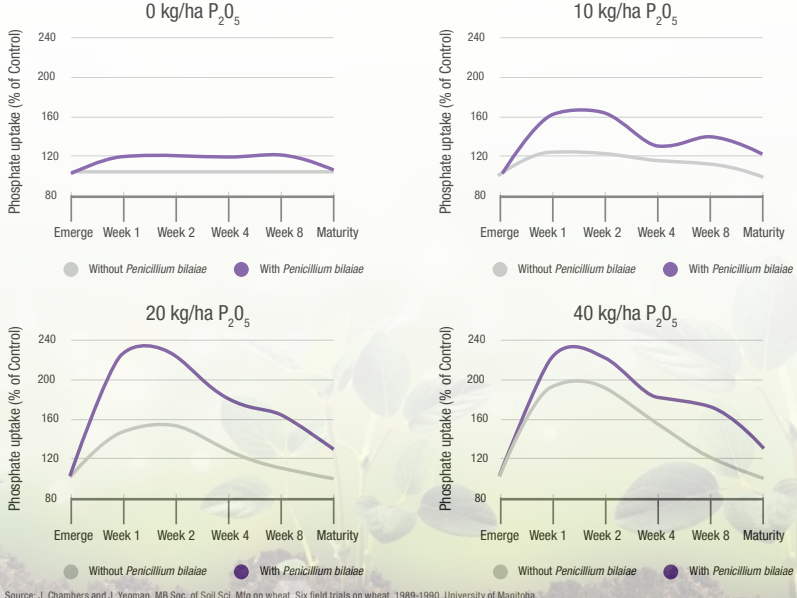
- Benefits from improved phosphate uptake for early tillering and uniformity
- BioniQ® provides multiple mechanisms for phosphate solubilization and increased uptake

Phosphate Fertilizer Efficiency

Biologicals enhance fertilizer use efficiency by making more applied phosphate accessible during the growing season, addressing limitations in early growth stages.

Penicillium bilaiae increases the availability of phosphate, resulting in increased uptake by the plant

Research data from the University of Manitoba graphed below, shows the increase in uptake of phosphate throughout the growing season when using *Penicillium bilaiae* on wheat.



Source: J. Chambers and J. Yeoman, MB Soc. of Soil Sci. Mtg on wheat. Six field trials on wheat, 1989-1990. University of Manitoba.

[1]Source: Sask Ag and Food

NEW Stronger Granules, Smoother Application: View TagTeam® BioniQ® in Action

If you're looking for a granular inoculant that flows more smoothly, meters more accurately and reduces dust buildup in your equipment, the improved formulation of TagTeam® BioniQ® delivers.

Built for Efficiency

The enhanced formulation of TagTeam® BioniQ® features:

- 99% particle hardness for less product loss and consistent metering
- Improved flowability with a reduced angle of repose for easier tank fills
- Low dust levels that reduce buildup and keep your equipment clean

Together, these upgrades ensure better application, fewer interruptions, and more reliable performance in the field.

See the Performance for Yourself

High Crush Strength Test

Watch how the improved TagTeam® BioniQ® granules hold up under pressure — literally. This video shows how the superior hardness compares to the competition.

Watch the Crush Strength Test Video.



Angle of Repose Test

Smoother product flow means faster, more even tank fills. In this video, you'll see how a lower cone height translates into better flowability on the job.

Watch the Flowability Test Video.



Dust Test

Less dust means less cleanup, better metering accuracy, and a smoother day in the cab. Compare the results side-by-side in this field-ready test.

Watch the Dust Test Video.



Stronger granules. Smoother application. Consistent performance.

LCO – Helping Plants Start Strong and Finish Stronger

In farming, a strong start to the season often sets the stage for how well crops will finish. That's where LCO comes in, giving plants the boost they need right from day one.

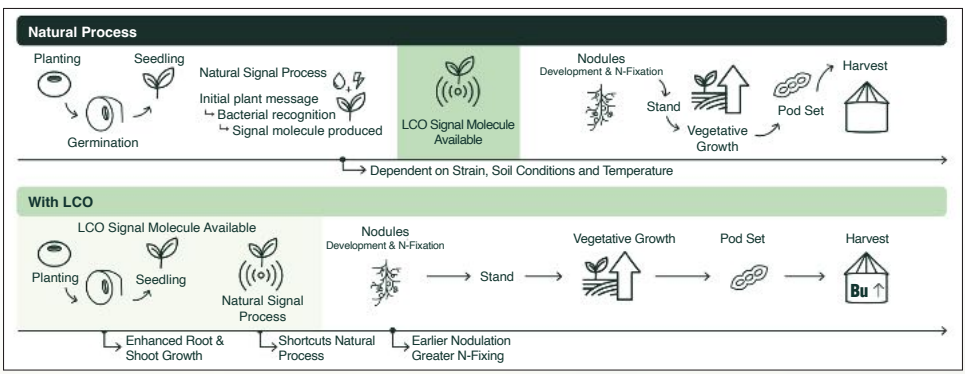
What is LCO?

LCO stands for lipo-chitooligosaccharide, which is a naturally occurring signalling molecule produced by beneficial microbes like rhizobia and mycorrhizal fungi. These signals are crucial for forming symbiotic relationships that enable plants to access essential nutrients.

How LCO Works with Rhizobia

In a typical legume crop, the plant sends out signals called flavonoids to attract rhizobia, the bacteria that are able to fix nitrogen. Once they get the message, rhizobia sends back an LCO signal that tells the plant that they are a species match and signals to the plant to start preparing for the rhizobia to enter.

By applying LCO with the seed, the conversation gets an early start. Nodulation occurs sooner, nitrogen starts moving faster, and the crop is off to a stronger start, regardless of the soil type, temperature, or variety.



How LCO Supports Mycorrhizal Fungi

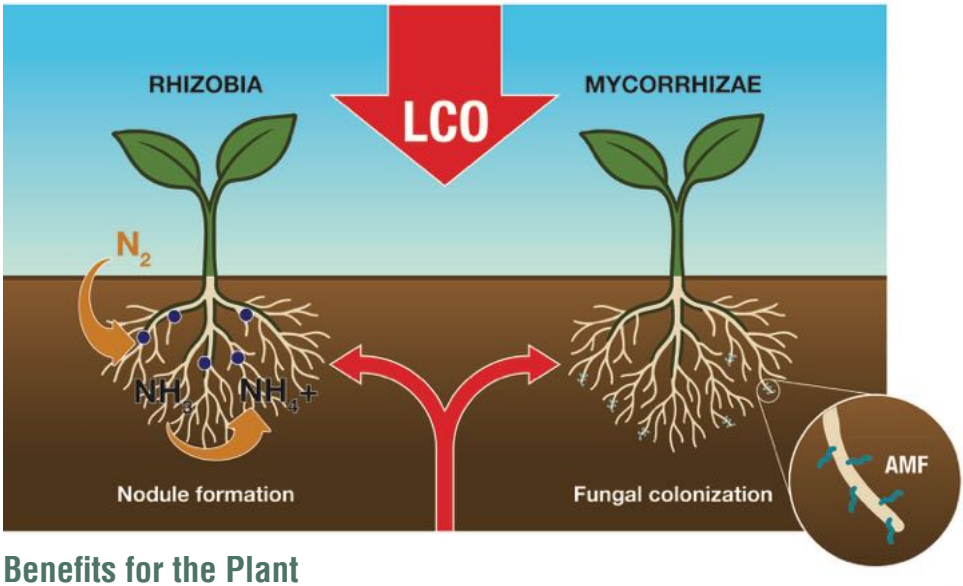
LCO also plays a critical role in helping plants connect with arbuscular mycorrhizal (AM) fungi. These fungi release LCO signals known as Myc factors, which trigger the plant to prepare the roots for colonization.

Once colonized, the fungi act like an extended root system, reaching into tiny soil pores to draw in water and essential nutrients that roots can't get on their own, which is especially important in low-phosphorus prairie soils.

Adding an LCO has shown an increase in mycorrhizal spore germination and increased mycorrhizal infection on the root hairs.

Both rhizobia and AM fungi activate the plant's (Symbiosis) signalling pathway, a built-in response that prepares roots for beneficial microbial entry. LCO taps into this shared communication channel, allowing earlier and more efficient symbiosis.

LCO – Helping Plants Start Strong and Finish Stronger



Benefits for the Plant

- Fix nitrogen sooner
- Access water and essential nutrients faster
- Build stronger roots
- Tolerate stress from heat, drought, and poor fertility

The Bottom Line

LCO helps plants and beneficial microbes do what they're already designed to do, just faster and more effectively. And that stronger start can lead to a stronger finish.

Get More From Every Acre With LCO

LCO gives crops a biological edge. Whether applied in-furrow as a liquid or embedded in your granule inoculant or as a liquid foliar with your herbicide or fungicide application, it helps establish key microbial partnerships earlier and more effectively, setting the stage for better nutrient use, stress tolerance, and yield.

In-furrow Application

When applied in-furrow at seeding, LCO signalling molecule:

- Kickstarts nodulation in legumes like lentil, pea and chickpea
- Increases colonization sites of mycorrhizal fungi on pulse and cereal roots
- Enhances phosphorus uptake and nitrogen efficiency
- Induces spore germination of native arbuscular mycorrhizal (AM) fungi
- Restores AM fungal networks after canola or brassica crops
- Supports early-season root and shoot development
- Improves plant tolerance to drought and stress

Foliar Application

When applied as a foliar spray, LCO signalling molecule:

- Improves plant energy and biomass
- Enhances internal sugar production
- Produces greater microbial activity in the root zone
- Induces gene expression within the plant to better withstand abiotic stresses

Rhizobia Bacteria Benefits by Crop

Crop	Ability to Fix Nitrogen	Key Benefits of Enhanced Nodulation and Nitrogen Fixation
Faba bean	Strong	Increases seed size and overall biomass
Soybean	Medium	Improved protein content, early nodulation, drought tolerance
Pea	Medium	Enhanced root development, reduced lodging risk
Chickpea	Medium	Better nodulation in alkaline soils, drought resilience
Lentil	Medium	Improved stand establishment, stress tolerance
Dry bean	Low to moderate	More even maturity, helps reduce fertilizer need

Get More From Every Acre With LCO

Mycorrhizal Benefits by Crop

Crop	Mycorrhizal Association	Key Benefits of Beneficial Microbial Colonization
Lentil	Strong	High P uptake, drought resilience, better root health, increased yield
Chickpea	Strong	Same as lentil; particularly responsive in low-P, dryland, or marginal soils
Field Pea	Strong	Improves phosphorus and zinc uptake, boosts early growth and yield
Soybean	Moderate to strong	Enhanced early root growth better nutrient uptake, yield gains in low-P soils
Wheat	Moderate to strong	Improved phosphorus use efficiency, root architecture, drought tolerance, yield stability
Barley	Moderate	Better phosphorus uptake and root exploration; moderate drought resilience
Oat	Moderate	Some benefits to early growth and P uptake; typically, less responsive than wheat or barley

Arbuscular mycorrhizal fungi (AM fungi or AMF) are a type of beneficial soil fungi that form symbiotic relationships with most crop plants. They help extend the reach of the root system and improve uptake of nutrients like phosphorus, as well as water and micronutrients.

Storage and Handling

The active ingredients in our inoculants are living organisms and require specific storage conditions to ensure viability and product performance.

To maintain product viability in packaging:

- Store all inoculants and treated seed under cool conditions, away from sunlight and direct heat sources
- Avoid temperature fluctuations and avoid freeze/thaw cycles
- Use before the expiration date. The expiration date is valid for unopened containers stored according to the conditions indicated.

Storage of granular inoculants

- Store in cool, dry conditions
- May be frozen; if granular inoculants freeze, keep frozen until shortly before use
- If granular inoculant freezes, lumps may form, please use a screen when filling your tank. When using drop bags on each side prior to opening.

Storage of liquid inoculants

- Avoid freezing
- Freezing liquid inoculants may result in damaged bladders and jugs, which can lead to contaminated product or problems with application

Storage of wettable powder

- May be frozen; if wettable powder does freeze, keep frozen until shortly before use
- Store unopened containers in a dry cool place, less than 20°C (68°F), away from sunlight and heat sources

If you would like more information or have questions, contact your local Biologicals by FMC representative or visit ag.fmc.com/ca/en/products/biologicals

BIOLOGICALS by FMC

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DEEPER THINKING, ADVANCING INNOVATION

From the lab to the field, everything we do at FMC is driven by our commitment to innovation. Through our ongoing R&D and advanced technologies, we are delivering sustainable, user-friendly solutions that help Canadian growers boost yields and maximize returns.

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