

BIOLOGICALS

by



Innovative Plant Health Solutions

2026 Product Guide



BIOLOGICALS

by

FMC

The Benefits of Biologicals

Investing in key nutrients like nitrogen, phosphate and potassium is essential to unlocking your crop's yield potential. Maximizing the effectiveness of these nutrients is crucial to your bottom line, as they are fundamental to your crop's health, affecting leaf, stalk, stem and root development.

In order to achieve maximum yields with your crops, soils often need to be supplemented – whether through traditional fertilizers or biological products. Biologicals play a unique role by enhancing nutrient availability, allowing you to make the most of your fertilizer investment.

These beneficial microbes not only fix atmospheric nitrogen for your pulse crops but also improve nutrient efficiency to promote early, vigorous crop growth. By fostering strong root systems, biologicals help your crops reach their full yield potential by season's end.



BIOLOGICALS

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BIOLOGICALS

Biologicals

BioniQ® – Barley . Canola . Mustard . Oats . Rye . Wheat **5**

Cell-Tech® – Lentil . Pea . Soybean **10**

JumpStart® – All Crops **13**

Nitragin® Gold – Alfalfa/sweet clover . Clover **16**

NEW

Optimize® FXC DS – Soybean **17**

TagTeam® – Chickpea . Lentil . Pea . Soybean **19**

IG
formulation

TagTeam® BioniQ® – Chickpea . Faba bean . Lentil . Pea **22**



Stronger Roots. Bigger Yields.

BioniQ® is designed to enhance nutrient availability and uptake through beneficial plant/microbe interactions for canola, mustard and cereal crops.

- Delivers three living biologicals in one formulation for season-long colonization.
- Solubilizes phosphorus and increases nutrient access leading to faster, stronger root growth.
- Performs in a variety of soil conditions and types: active in cool soils for early-season vigour.
- Allows for earlier, more uniform maturity.
- Works seamlessly with many different seed treatments for added flexibility.
- Compatible with our new Avoda® PRO seed treatment for reliable protection against a complete label of seed- and soil-borne diseases in cereals.

Biologicals Actives:

Biological Actives	Function
<i>Penicillium bilaiae</i> (2 strains)	Solubilizes inorganic phosphorus in both warm and cool soil conditions
<i>Bacillus amyloliquefaciens</i>	Increases availability and uptake of nutrients while strengthening root and shoot growth
<i>Trichoderma virens</i>	



Formulation(s):

Wettable powder

Application:

Rates:

Crop	783 g box	Water Volume	
		Bare Seed (recommendation)	Avoda® PRO Seed Treatment Tank-mix (min. per box)*
Barley	250 bu	34 L	Not tested
Canola	10 bags	5 L	Not tested
Mustard	10 bu	5 L	Not tested
Oats	250 bu	24 L	Not tested
Rye	250 bu	39 L	Not tested
Wheat	250 bu	42 L	10 L

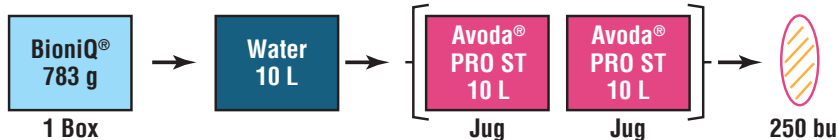
* Minimum water amount per case ONLY pertains to Avoda® PRO seed treatment. For all other tank-mix combinations, use recommended bare seed water volume minus the seed treatment amount.



Wettable Powder Directions:

- Can be applied utilizing commercial on-seed application equipment.
- Applicators used previously for pesticides should be triple rinsed before being used for BioniQ® application.
- Open package only when ready to use and use before expiration date.
- Inoculate seed on-farm by adding and thoroughly mixing the entire contents of both Wettable Powder A (333 g) and Wettable Powder B (450 g) in the appropriate amount of water.
- BioniQ® can be applied up to 60 days prior to seeding, depending on seed type, seed treatment and application method.
- **When applying to bare seed**, add BioniQ® to recommended rate of water (see table on page 5), mix well and apply to seed.
- **When tank-mixing with a compatible product**, add BioniQ® powder to at least the minimum water requirement as outlined in the table on page 5, mix well, and then add mixture directly into seed treatment and apply to seed.

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



- Do not let BioniQ® sit in a water slurry for more than 2 hours before application, as in-tank survival may be significantly reduced.
- Mixing water rates may vary depending on seed treating conditions, but BioniQ® must be applied to the correct volume of seed.

Compatibility:

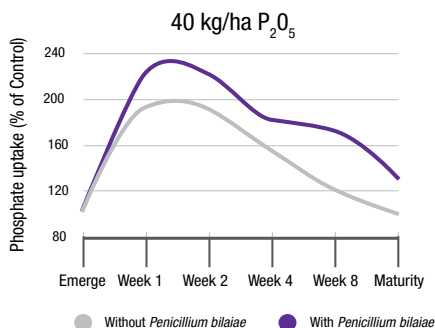
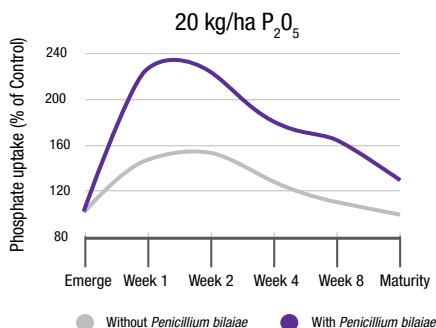
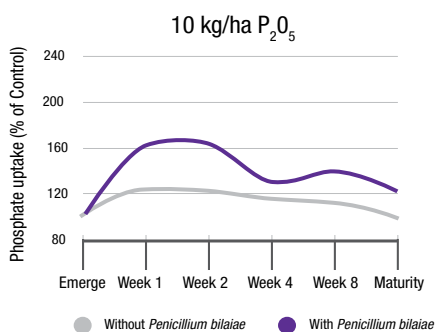
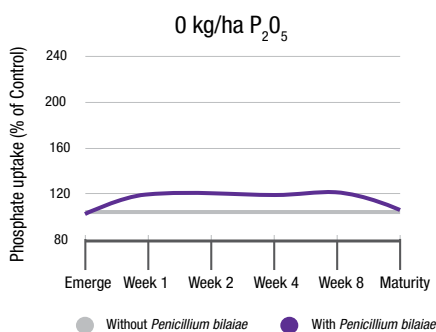
See page 27 for BioniQ® seed treatment compatibility by crop.

Packaging:



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. Mfg on wheat. Six field trials on wheat, 1989-1990, University of Manitoba.

Proof of Performance:

Improved Uniformity & Root Establishment in Canola



Source: Taber, AB. Photo taken: May 28, 2025

BioniQ® Increases Foliar Growth for a Faster Start



Source: Taber, AB. Non-irrigated land. Photo taken: May 28, 2025

In-Field Yield Trials

In every program, there will be wins, losses and ties. The Novonesis Field Trial program focuses on full data transparency — sharing every trial result to demonstrate proof of performance, not just promises.

Canola (87 Trials)

Untreated 44.9 (bu/ac)

BioniQ® 46.9 (bu/ac)



Win Rate



Yield Advantage

Source: Results were collected from 87 farmer-conducted, large-scale, side-by-side trials conducted in Western and Eastern Canada from 2017-2022.

Wheat (46 Trials)

Untreated 63.5 (bu/ac)

BioniQ® 66.6 (bu/ac)



Win Rate



Yield Advantage

Source: Results were collected from 46 farmer-conducted, large-scale, side-by-side trials conducted in Western Canada from 2017-2022.

Barley (19 Trials)

Untreated 77.0 (bu/ac)

BioniQ® 81.0 (bu/ac)



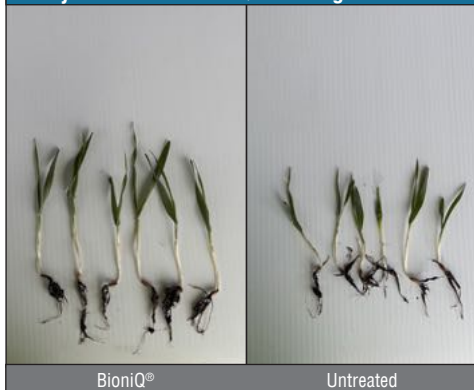
Win Rate



Yield Advantage

Source: Results were collected from 19 farmer-conducted, large-scale, side-by-side trials conducted in Western Canada from 2017-2022.

Barley Treated with BioniQ® Showing Faster Growth



BioniQ®

Untreated

Source: Clavet, SK. Photo taken: May 23, 2025

Phenomenal Growth Performance in Oats



BioniQ®

Untreated

Source: Carnduff, SK. Photo taken: June 3, 2025

Stronger Roots and Early Vigour in Durum



BioniQ®

Untreated

Source: Assiniboia, SK. Photo taken: May 23, 2025

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 granular, peat and liquid forms, giving growers flexibility in how they apply it.
- Apply in combination with JumpStart® if phosphate is limited.

Biologicals Actives:

Biological Actives	Function
<i>Rhizobium leguminosarum</i>	Fixes nitrogen
<i>Bradyrhizobium japonicum</i>	Fixes nitrogen

Formulation(s):

Crop	Actives	Type
Pea, lentil	<i>Rhizobium leguminosarum</i>	Liquid, peat, granular
Soybean	<i>Bradyrhizobium japonicum</i>	Liquid, peat, granular

Application:

Liquid Formulation

Rates:

Crop	Size	Volume of Seed Treated
Pea, lentil	3.0 L	40 bu
	9.8 L	130 bu
Soybean	3.1 L	50 units
	12.5 L	200 units

Liquid Directions:

- Apply directly to pea, lentil or soybean seed at a rate of 278 ml/100 kg seed.
- Planting window on bare pea or lentil seed is 48 hours.
- 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 (bag)	Volume of Seed Treated	Slurry Water Rate*
Pea	2.20 kg bag	50 bu	4.0 L
Lentil	2.20 kg bag	30 bu	2.5 L
Soybean	2.32 kg bag	30 units	3.0 L

*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:
 - Dry to pre-moistened seed
 - By adding water while applying Cell-Tech®
 - Recommended: Mix with cool, clean water and apply to seed as a slurry (refer to above table).
- 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:

Row Spacing	Pea and Lentil			Soybean		
	Application Rate	18.0 kg bag	454 kg tote	Application Rate	18.0 kg bag	454 kg tote
	lb/acre	acre/bag	acre/bag	lb/acre	acre/bag	acre/bag
7 in	6.6	6.1	151.7	6.2	6.5	161.5
8 in	5.8	6.9	172.6	5.4	7.3	185.4
9 in	5.1	7.8	196.3	4.7	8.4	213.0
10 in	4.6	8.7	217.6	4.3	9.3	232.8
12 in	3.8	10.5	263.4	3.6	11.0	278.1
15 in	3.1	13.3	333.7	2.9	13.8	345.2
24 in	-	-	-	1.8	22.2	556.1
30 in	-	-	-	1.4	28.6	715.0

Note: The bulk density of Cell-Tech® granular is approximately 0.6 g/cm³ (37 lb/ft³).





















- Apply 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 granules into the 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 into the tank.
- 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 29 for Cell-Tech® seed treatment compatibility by formulation and crop.

Packaging:

Pea/Lentil		Peat	7	x	2.2 kg bag	=	
		Granular	1	x	18 kg	=	
		Granular	1	x	454 kg	=	
		Liquid	4	x	3 L	=	
		Liquid	1	x	9.8 L	=	
Soybean		Peat	7	x	2.32 kg bag	=	
		Granular	1	x	18 kg	=	
		Granular	1	x	454 kg	=	
		Liquid (East only)	4	x	3.1 L	=	
		Liquid	1	x	12.5 L	=	

Maximize Phosphate, Maximize Yield.

JumpStart® is a leading biological inoculant that enhances phosphate availability in the soil, helping crops maximize nutrient 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.
- Flexible application timing.
- Compatible with our new Avoda® PRO seed treatment for reliable protection against a complete label of seed- and soil-borne diseases in cereals.

Biologicals Actives:

Biological Actives	Function
<i>Penicillium bilaiae</i>	Solubilizes inorganic phosphorus

Formulation(s):

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

Application:

Liquid Formulation

Rates:

Crop	Container Size	Volume of Seed Treated	Water Volume (approximate)
Wheat	60 mL	40 bu	7.0 L
	600 mL	400 bu	70 L
Pea	60 mL	70 bu	6.0 L
	600 mL	700 bu	60 L
Chickpea	60 mL	55 bu	4.0 L
	600 mL	550 bu	40 L
Dry Bean ¹	60 mL	40 bu	3.5 L
	600 mL	400 bu	35 L
Lentil	60 mL	40 bu	3.5 L
	600 mL	400 bu	35 L
Soybean	60 mL	40 units	2.8 L
	600 mL	400 units	28 L

Liquid Formulation

Rates:

Canola/mustard	60 mL	140 lb	1.5 L
	600 mL	1400 lb	15 L
Alfalfa/sweet clover	60 mL	150 lb	1.5 L
	600 mL	1,500 lb	15 L
Corn	60 mL	10 units*	2.8 L
	600 mL	100 units*	28 L

[†] 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 (see page 33).

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	11.0
10 in	3.3	12.0
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 33 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

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	<i>Sinorhizobium meliloti</i>	Fixes nitrogen
Nitragin [®] Gold clover	<i>Rhizobium leguminosarum biovar trifolii</i>	Fixes nitrogen

Formulation(s):

Clay based

Application:

Crops	Volume of Seed Treated
Red clover	19 kg / 5,000 lb
White, ladino, alsike clover	19 kg / 2,500 lb
Alfalfa/sweet clover	19 kg / 5,000 lb

Directions:

- Bulk treatment by the seed processor.
- Time on seed for alfalfa/sweet clover is 24 months and 6 months on clover.
- Apron[®] XL / Allegiance[®] FL compatible: Compatibility with Nitragin[®] Gold alfalfa/sweet clover and Apron[®] XL and Allegiance[®] FL seed treatments will allow the combined benefits of an inoculant and a fungicide where required. Nitragin[®] Gold clover is not compatible.
- Nitragin[®] Gold alfalfa/sweet clover is OMRI Listed for organic use. Note: Nitragin[®] Gold clover is not OMRI Listed.

Packaging:

Alfalfa/
Sweet clover



Clay Powder

1

x

19 kg

=



Clover



Clay Powder

1

x

19 kg

=



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*.
- Fortified powerful signaling molecule, LCO Promoter Technology™, to initiate nodulation and increased consistency across a range of environmental and soil conditions.
- Broad compatibility with 120 days on-seed with most seed treatments.
- Retailer applied on-seed liquid formulation.

Next generation Optimize[®] FXC DS offers enhanced performance due to the added strain of Bradyrhizobia and the more concentrated LCO Promoter Technology™ amount within the inoculant.

Biologicals Actives:

Biological Actives	Function
<i>Bradyrhizobium japonicum</i> (2 strains)	Fixes nitrogen
LCO (lipo-chitooligosaccharide) technology	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
Large Case	Component A (LCO + Extender): 2.01 L jug Component B (<i>Bradyrhizobia</i>): 6.87 L bladder	400	20,000
Box	Component A (LCO + Extender): 2 x 0.201 L jug Component B (<i>Bradyrhizobia</i>): 2 x 0.686 L bladder	80	4,000

Liquid Directions:

- Applied to soybean seed by retailers.
- Contact your seed retailer to order.
- Inoculate bare seed up to 220 days before seeding.
- Seed companies may get planting windows that extend beyond the standard 120-day planting window when Optimize[®] FXC DS is applied with a seed treatment.
- Read the label before application for complete use instructions.

Compatibility:

See page 35 for Optimize[®] FXC DS seed treatment compatibility.

Packaging:

Soybean



Liquid

(1 x 6.9 L bladder) +
(1 x 2 L jug of liquid additive)

=

1 case



Liquid

(2 x 0.686 L bladder) +
(2 x 0.2 L jugs of liquid additive)

=

5 small boxes
packaged in
1 large case



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.
- Available in granular, peat and liquid formulations to suit various application practices and equipment.
- TagTeam® Soybean is available with improved granular formulation for superior handling and flowability.

Biologicals Actives:

Biological Actives	Function
<i>Rhizobium leguminosarum</i> or <i>Mesorhizobium ciceri</i> or <i>Bradyrhizobium japonicum</i>	Fixes nitrogen
<i>Penicillium bilaiae</i>	Solubilizes inorganic phosphorus

Formulation(s):

Crops	Actives	Type
Chickpea	<i>Penicillium bilaiae</i> + <i>Mesorhizobium ciceri</i>	Peat
Pea, lentil	<i>Penicillium bilaiae</i> + <i>Rhizobium leguminosarum</i>	Liquid, peat
Soybean	<i>Penicillium bilaiae</i> + <i>Bradyrhizobium japonicum</i>	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 chickpea, lentil, pea seed is 48 hours.

Peat Formulation

Rates:

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

*Approximate water volume for peat slurry application.

Peat Directions:

- A separate sticker is not needed. TagTeam® peat has its own sticker in the formulation.
- Can be applied one of three ways:
 - Dry to pre-moistened seed
 - By adding water while applying TagTeam®
 - Recommended: Mix with cool, clean water and apply to seed as a slurry (refer to above table).
- Can be applied up to 48 hours before seeding lentils and peas, and can be used with many different seed treatments (see chart on page 37 for guidelines).
- Planting window on bare chickpea is 6 hours.

Improved Granular Formulation – Soybeans Only

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 - soybeans only:











- 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 37 for TagTeam® seed treatment compatibility by formulation and crop.

Packaging:

Chickpea		Peat	(7 x 2.2 kg bags)	=	
		Peat	(7 x 2.2 kg bags)	=	
Pea/Lentil		Liquid	(4 x 3 L bladder) + (4 x 57 g WP bottle) =		
		Improved Granular	(1 x 16.5 kg bags)	=	
Soybean		Improved Granular	(1 x 16.5 kg bags)	=	

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 in pea and lentil crops due to LCO Promoter Technology™ regardless of environmental conditions.

Biologicals Actives:

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

Formulation(s):

Crops	Actives	Type
Pea, lentil	<i>Penicillium bilaiae</i> + <i>Rhizobium leguminosarum</i> + <i>Bacillus amyloliquefaciens</i> + <i>Trichoderma virens</i> + LCO	Improved Granular
Chickpea	<i>Penicillium bilaiae</i> + <i>Mesorhizobium ciceri</i> + <i>Bacillus amyloliquefaciens</i> + <i>Trichoderma virens</i>	Improved Granular
Faba bean	<i>Penicillium bilaiae</i> + <i>Rhizobium leguminosarum</i> + <i>Bacillus amyloliquefaciens</i> + <i>Trichoderma virens</i>	Improved Granular

Application:

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/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.
- 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		Improved Granular	1	x	16.5 kg	=	
		Improved Granular	1	x	454 kg	=	
Faba bean		Improved Granular	1	x	16.5 kg	=	
		Improved Granular	1	x	454 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

In-Field Yield Trials

Producers, retailers, and agronomists share a common goal: higher yields, stronger performance, and better ROI. While many products make that promise, TagTeam® BioniQ® delivers — with large-scale field trials and proven data to back it up.

Pea (43 trials)

Competitors 51.8 (bu/ac)

TagTeam® BioniQ® 54.5 (bu/ac)



Win Rate



Yield Advantage

Source: Results were collected from 43 farmer-conducted, large-scale, side-by-side trials conducted in Western Canada from 2017-2022.

Lentil (41 trials)

Competitors 24.2 (bu/ac)

TagTeam® BioniQ® 25.1 (bu/ac)



Win Rate



Yield Advantage

Source: Results were collected from 41 farmer-conducted, large-scale, side-by-side trials conducted in Western Canada from 2017-2022.

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.



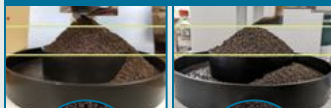
Resistance to attrition test

- 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.

BIOLOGICALS

by

FMC

Compatibility

- BioniQ® Compatibility 27
- Cell-Tech® Compatibility 29
- JumpStart® Compatibility 33
- Optimize® FXC DS Compatibility 35
- TagTeam® Compatibility 37

COMPATIBILITY



Compatibility:

Barley and Oat Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Cruiser® Vibrance® Quattro	60 days	60 days	60 days
Dividend Extreme®	30 days	30 days	Not Recommended
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 MD	60 days	60 days	30 days
Raxil® PRO Shield	60 days	60 days	30 days
Terraxa™ F4	60 days	60 days	Not Recommended
Vibrance® Quattro	60 days	60 days	60 days
Vibrance® Quattro + Cruiser® 5FS	60 days	60 days	60 days
Vitaflo® 280	Not Recommended	Not Recommended	Not Recommended

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	•	•



Wheat Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application ¹
Avoda® PRO Seed Treatment (FMC)	60 days	60 days	30 days
Cruiser® Vibrance® Quattro	60 days	60 days	60 days
Dividend Extreme®	30 days	30 days	Not Recommended
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
Rancona® Trio	60 days	60 days	30 days
Raxil® PRO MD	60 days	60 days	30 days
Raxil® PRO Shield	60 days	60 days	30 days
Straxan™	60 days	60 days	60 days
Terraxa™ F4	60 days	60 days	Not Recommended
Vibrance® Quattro	60 days	60 days	60 days
Vibrance® Quattro + Cruiser® 5FS	60 days	60 days	60 days
Vitaflo® 280	Not Recommended	Not Recommended	Not Recommended

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

Bare Seed: Add BioniQ® to recommended rate of water (see table on page 5), mix well and apply to seed.

Compatibility:

Liquid Formulation

Pea Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
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	•
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	Not Recommended	Not Recommended
Stress Shield® 600 + Pro-lzed® Blue Colourant (high rate)	•	6 hours	Not Recommended
Trilex® EverGol®	Not Recommended	Not Recommended	Not Recommended
Trilex® EverGol® Shield (104 ml rate)	Not Recommended	Not Recommended	Not Recommended
Vibrance® Maxx	48 hours	48 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	Not Recommended	Not Recommended	•

Lentil Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	Not Recommended
EverGol® Energy	•	6 hours	•
EverGol® Energy + Stress Shield®	•	Not Recommended	•
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

Lentil Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Stress Shield® 600 + Pro-lzed® Blue Colourant (104 ml + 20 ml rate)	•	24 hours	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	24 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	8 hours	•
Zeltera™ Pulse	Not Recommended	Not Recommended	•

Soybean Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Acceleron® Seed Applied Solutions STANDARD*	4 days	4 days	•
Cruiser Maxx® Vibrance® Beans	4 days	4 days	•
EverGol® Energy²	4 days	4 days	•
EverGol® Energy² + 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	•



Peat Formulation

Pea Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Allegiance® FL	24 hours	12 hours	•
Apron Maxx® Peas	48 hours	24 hours	24 hours
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
EverGol® Energy	24 hours	24 hours	•
EverGol® Energy + Stress Shield® 600	24 hours	24 hours	•
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	•
Rancona® Trio	6 hours	2 hours	•
Stress Shield® 600 + Pro-lized® Blue Colourant (high rate)	•	6 hours	Not Recommended
Trilex® AL	30 hours	24 hours	Not Recommended
Trilex® EverGol®	48 hours	48 hours	48 hours
Trilex® EverGol® Shield (104 ml rate)	24 hours	24 hours	Not Recommended
Vibrance® Maxx	48 hours	48 hours	48 hours
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	48 hours	48 hours	•

Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Allegiance® FL	48 hours	24 hours	•
Crown®	24 hours	Not Recommended	•
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
EverGol® Energy	24 hours	24 hours	•
EverGol® Energy + Stress Shield® 600	6 hours	6 hours	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo	48 hours	48 hours	•
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
Lumivia™ CPL	48 hours	48 hours	•
Rancona® Trio	6 hours	2 hours	•

Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Stress Shield® 600 + Pro-Ized® Blue Colourant (104 ml + 20 ml rate)	•	24 hours	Not Recommended
Trilex® AL	24 hours	6 hours	•
Trilex® EverGol®	48 hours	48 hours	48 hours
Trilex® EverGol® Shield (104 ml rate)	48 hours	48 hours	Not Recommended
Vibrance® Maxx	48 hours	48 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	48 hours	48 hours	•

Soybean Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
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: 48 hours before seeding pea and lentil. 4 days before soybean.

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	•	•

Chickpea Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application ¹
Trilex® AL	30 days	30 days	•

Lentil Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application ¹
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® AL	30 days	30 days	•
Trilex® EverGol®	30 days	30 days	15 days
Trilex® EverGol® + Stress Shield® 600 (208 ml/100 kg)	30 days	30 days	Not Recommended
Zeltera™ Pulse	30 days	30 days	Not Recommended

Pea Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Allegiance® FL	30 days	30 days	•
Apron Maxx® Peas	15 days	15 days	•
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® AL	30 days	30 days	•
Trilex® EverGol®	30 days	30 days	30 days
Trilex® EverGol® + Stress Shield® 600 (208 ml/100 kg)	30 days	30 days	Not Recommended
Zeltera™ Pulse	30 days	30 days	Not Recommended

Soybean Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Cruiser Maxx® Vibrance® Beans	120 days	120 days	30 days
EverGol® Energy²	120 days	120 days	30 days
EverGol® Energy² with Stress Shield® 600 (104 ml rate)	120 days	120 days	Not Recommended
Insure® Pulse	•	30 days	•
Trilex® AL	7 days	7 days	•

Wheat Planting Window

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Avoda® PRO Seed Treatment (FMC)	30 days	30 days	30 days
Cruiser® Vibrance® Quattro	30 days	30 days	30 days
EverGol® Energy²	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.

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 [®] Energy ² + Stress Shield [®] 600 (104 ml low rate)	120 days	120 days	•	220 days
Fortenza [®]	•	120 days	•	220 days
Fortenza [®] + Acceleron [®] Seed Applied Solutions BASIC*	•	120 days	•	220 days
Fortenza [®] + Saltro [®] + Vayantis [®] IV	120 days	120 days	•	220 days

Liquid Formulation

Seed Treatment	Sequential Application	Simultaneous Application	When using additional liquid additive (extender) ¹	
			Sequential Application	Simultaneous Application
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
Lumiderm®	120 days	120 days	•	60 days
Lumisena™	120 days	120 days	220 days	220 days
Rancona® Trio	Not Recommended	Not Recommended	220 days	220 days
Vayantis® IV	120 days	120 days	Not Recommended	Not Recommended
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
Zeltera™ Pulse	Not Recommended	Not Recommended	Not Recommended	Not Recommended

• 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.

Compatibility:

Liquid Formulation

Lentil Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	Not Recommended
EverGol® Energy	•	6 hours	•
EverGol® Energy + Stress Shield®	•	Not Recommended	•
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	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	24 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	Not Recommended	Not Recommended	•

Pea Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application
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	•
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	Not Recommended	Not Recommended

Pea Planting Window (Liquid Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application
Stress Shield® 600 + Pro-Ized® Blue Colourant (high rate)	•	6 hours	Not Recommended
Trilex® EverGol®	Not Recommended	Not Recommended	Not Recommended
Trilex® EverGol® Shield (104 ml rate)	Not Recommended	Not Recommended	Not Recommended
Vibrance® Maxx	48 hours	48 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	Not Recommended	Not Recommended	•

Peat Formulation

Chickpea Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Allegiance® FL (kabuli)	6 hours	6 hours	•
Allegiance® FL/Crown®	4 hours	4 hours	•
Apron® Advance	6 hours	6 hours	•
Crown®	6 hours	6 hours	•
Cruiser® 5FS + Vibrance® Maxx	6 hours	6 hours	•
EverGol® Energy	•	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® 480 (desi)	6 hours	6 hours	•
Trilex® AL	4 hours	4 hours	•
Vibrance® Total	6 hours	6 hours	•

Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Allegiance® FL	48 hours	24 hours	•
Crown®	24 hours	Not Recommended	•
Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	•
EverGol® Energy	24 hours	24 hours	•
EverGol® Energy + Stress Shield® 600	6 hours	6 hours	•
Insure® Pulse	Not Recommended	Not Recommended	Not Recommended
Intego™ Solo	48 hours	48 hours	Not Recommended

Lentil Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
Intego™ Solo + Cruiser® 5FS + Vibrance® Maxx	48 hours	48 hours	Not Recommended
Intego™ Solo + Trilex® EverGol®	48 hours	48 hours	•
Lumivia™ CPL	48 hours	48 hours	•
Lumivia™ CPL + Trilex® EverGol®	24 hours	24 hours	•
Rancona® Trio	6 hours	2 hours	•
Trilex® AL	24 hours	6 hours	•
Trilex® EverGol®	48 hours	48 hours	48 hours
Trilex® EverGol® Shield (104 ml rate)	48 hours	48 hours	Not Recommended
Vibrance® Maxx	48 hours	48 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	48 hours	48 hours	•

Pea Planting Window (Peat Formulation)

Seed Treatment	Sequential Application	Simultaneous Application	Tank-Mix Application¹
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	•
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	Not Recommended	Not Recommended
Stress Shield® 600 + Pro-Ized® Blue Colourant (high rate)	•	6 hours	Not Recommended
Trilex® EverGol®	Not Recommended	Not Recommended	Not Recommended
Trilex® EverGol® Shield (104 ml rate)	Not Recommended	Not Recommended	Not Recommended
Vibrance® Maxx	48 hours	48 hours	Not Recommended
Vibrance® Maxx RFC	48 hours	48 hours	•
Vibrance® Total	48 hours	48 hours	•
Zeltera™ Pulse	Not Recommended	Not Recommended	•

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 Liquid Formulation on Bare Seed:

- 48 hours before chickpea, lentil and pea.

Planting Window for Peat Formulation on Bare Seed:

- 48 hours before seeding lentil and pea.
- 6 hours before chickpea.

NOTES

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BIOLOGICALS

by

FMC

Research Update

The following products have been registered through the PMRA and/or CFIA. FMC is currently working to understand their fit in the marketplace and will make them available for sale once performance has been thoroughly evaluated through extensive testing. In partnership with Novonosis, FMC is actively collecting performance data and in-field results to ensure we bring forward high-value solutions that help your crops reach their full yield potential.

Ataplan® – Corn . Soybean . Sunflower **43**

Ratchet® – Barley . Canola . Pulses . Wheat . Oats . And more **44**

Torque® IF – Cereals . Oilseeds . Pulses . Vegetables **45**



Biocontrol. Multi-Strain Power. Healthier Roots.

Ataplan[®] biological fungicide is the first proprietary biological seed treatment product from FMC in Canada that is registered by PMRA. It is a multi-strain product that can help manage fungal diseases in soybean, corn and sunflowers.

- Two microbial strains combined for protection against SDS, fusarium and rhizoctonia
- Reduced SDS incidence by 48% in research trials
- Available in an easy-to-use SC formulation
- Forms a biofilm on root to help with season-long protection
- Combine Ataplan[®] biological fungicide (FRAC BM02) with a synthetic seed treatment for combating fungicide resistance

RESEARCH UPDATE:

FMC is currently conducting field trials and gathering data to expand the crop label.

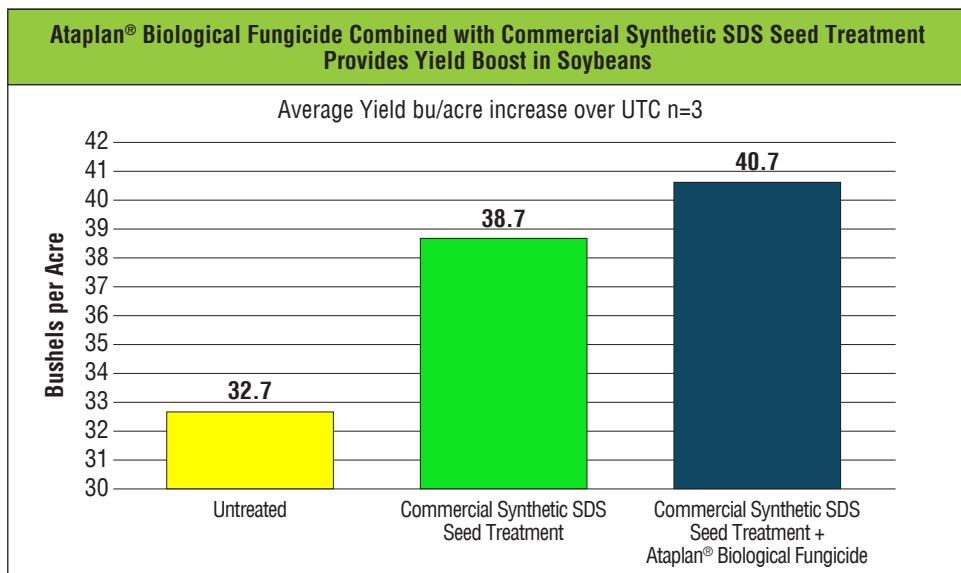
Biologicals Actives:

Bacillus velezensis and *Bacillus subtilis*

Formulation(s):

Suspension concentrated live organism

Proof of Performance:



Source: Internal Research Trial. Ontario 2021. UTC and all treatment had a base treatment of Cruiser Maxx[®]. Sites had SDS and SCN.



Fuel Growth From the Inside Out.

NEW! Ratchet® is a foliar-applied signaling molecule that uses LCO Promoter Technology™. Formulated for ease-of-use and compatibility with post-emergence applications, Ratchet® enhances the plant's nutritional capabilities.

- LCO Promoter Technology™ applied as a foliar application improves photosynthetic capacity, stress tolerance and yield potential.
- Powerful signal molecule that activates plant processes and expands sugar production.
- Compatible with foliar herbicides, fungicides, insecticides and nutritional products.
- Wide application window and tank-mix options.

Biologicals Actives:

Biological Actives	Function
LCO (lipo-chitoooligosaccharide) technology	Improves photosynthetic capacity, sugar production resulting in an increase in overall crop performance.

Formulation(s):

Liquid

From Roots to Results: Boosts Mycorrhizal Power for Resilient, High-yielding Crops.

NEW! Torque® IF is a signalling molecule applied in furrow that uses LCO Promoter Technology™ to increase mycorrhizal associations along plant roots, leading to increased stress tolerance and higher yields.

- Natural bacteria to plant signaling molecule increases N-fix nodulation in legumes.
- Enhanced plant growth through expanded root volume.
- Signaling molecule increases mycorrhizal root association and mycorrhizal spore germination.
- Specially formulated for easy, flexible application with liquid starter fertilizers.

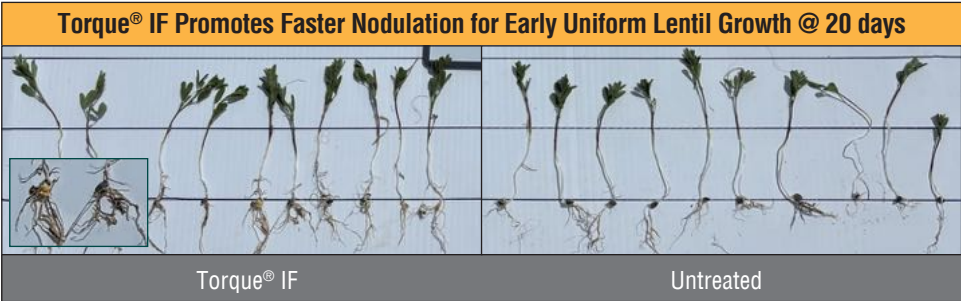
Biologicals Actives:

Biological Actives	Function
LCO (lipo-chitooligosaccharide) technology	Increases association with mycorrhizae for most crops and allows enhanced and earlier nodulation in pulse crops

Formulation(s):

Liquid

Proof of Performance:



Source: Hoosier, SK. Seeded May 7, 2025. Photo taken: May 27, 2025. Used with a single strain rhizobia seed inoculant.

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BIOLOGICALS

by



Other Resources

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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 pesticides and other seed treatments.

Each inoculant – BioniQ®, Cell-Tech®, JumpStart®, Optimize® FXC DS, QuickRoots® and TagTeam® – is tested with different seed treatments using a variety of application methods across specific crops. The planting windows provided in terms of the specific application methods apply only to the inoculants listed above.

Application Methods

Sequential Application

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

Simultaneous Application

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

Timing matters: Follow the product label 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.

A tank-mix refers to the practice of mixing two or more crop protection products (such as seed-treatment, herbicides, insecticides, fungicides, or fertilizers) together in the tank and making a single application whether it is on the seed or in the field.



Double Inoculants In Soybeans: When It Makes Sense

Soybeans, like other legumes, 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.

This adding of *Bradyrhizobium* inoculant is a natural nitrogen-boosting process which is especially important in nitrogen-poor soils like those found in Western Canada where native *Bradyrhizobium* levels are low or even non-existent.

Inoculant Types

- Peat-based or liquid inoculants: Applied on the seed or in furrow, 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. Studies have shown that introduced populations decline over time and have a rapid rate of genetic change 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 subsequent years. 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). More rhizobia and more root contact points mean a better shot at success.

- New soybean fields: No natural rhizobia to help with nodulation.
- Previous inoculation didn't work: Maybe the last attempt wasn't effective or weather got in the way.
- 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 inoculated¹.

Best Practices

- Match the inoculant type and application method to your soil and cropping history.
- 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/>

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

- Require 22–27 lb. P_2O_5 /ac for a 30 bu/ac crop
- Sensitive to seed-placed fertilizer; biologicals support early vigour and nitrogen fixation

Wheat

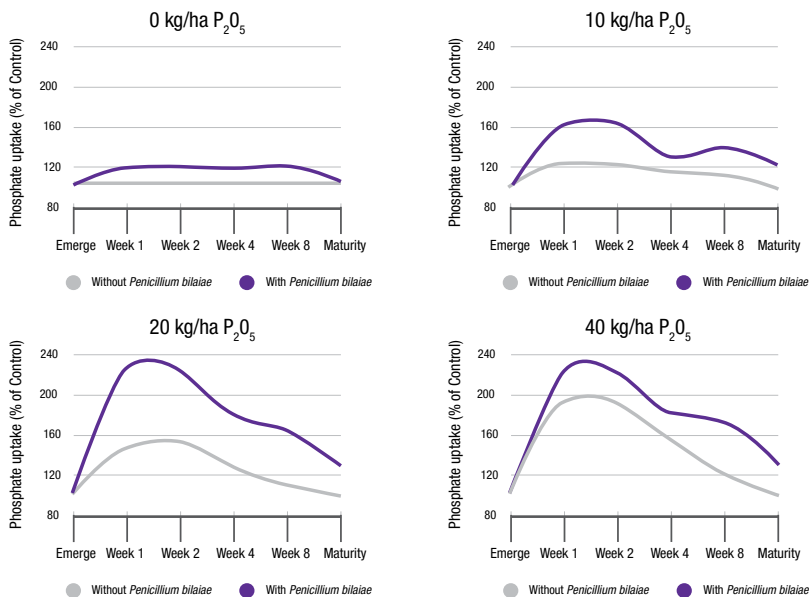
- Benefits from improved phosphate uptake for early tillering and uniformity
- BioniQ® provides multiple mechanisms for phosphate solubilization and increased uptake

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.

Made-in-Canada Innovations Drive the Future of Ag Biologicals

Novonesis is helping lead a new era in ag biological innovation, with deep roots in Western Canada 🇨🇦 and a legacy that began with the pioneering work of Philom Bios. From its early days in Saskatoon, the company has helped shape the global biologicals industry through science-backed, grower-tested solutions that deliver in the field.

JumpStart® is one of the most important Canadian innovations. Its development is due to research conducted on *Penicillium bilaiae* and the benefits it provides in the soil. *Penicillium bilaiae* is a naturally occurring soil fungus that helps make phosphorus more available to crops. Early work by Canadian researchers, licensed from Agriculture and Agri-Food Canada, laid the groundwork for what would become a game-changing tool for improving early-season nutrition and crop establishment.



Philom Bios, the company that eventually became Novonesis, partnered with universities and growers to develop JumpStart® and bring it to market. That approach — rigorous science, agronomic integration, and large-scale field trials — continues to define the Novonesis process today. It's a proven model for turning innovation into practical solutions that farmers can trust.

Building on that foundation, Novonesis introduced TagTeam®, a dual-action inoculant that combines phosphorus-solubilizing microbes with nitrogen-fixing rhizobia. Especially effective for pulse crops, it gave Western Canadian growers a new option to maximize the effects of traditional fertilizers applied to their fields. Later, through hundreds of on-farm trials and refinements, Novonesis developed BioniQ®, a biological seed treatment for cereals and canola.

Each product follows a three-pillar development process: scientific understanding of the microbe, agronomic fit in real-world systems, and data gathered through hands-on field testing. That combination ensures Novonesis biologicals work not just in theory, but in practice.

With interest in biologicals growing rapidly, more companies are entering the space, but not always with the same level of research or field results. Novonesis stands apart by focusing on quality over hype. Its team continues to deliver products that are backed by decades of experience, strong data, and field-proven performance.

The company's partnership with FMC Canada has helped accelerate that work. FMC's investment in biologicals and support for boots-on-the-ground agronomy have expanded access to Novonesis innovations through trusted retail and grower networks.

Western Canadian farmers have played a major role in developing and advancing these solutions. Their openness to innovation and willingness to test new tools have helped make the region a proving ground for biologicals. That spirit of partnership continues to guide the company's work.

Made-in-Canada Innovations Drive the Future of Ag Biologicals

Looking ahead, Novonosis is exploring new opportunities for biologicals in integrated crop strategies. Products aimed at biocontrol, particularly for crops like chickpea where resistance to traditional crop protection products is rising, are expected to complement existing tools and fill critical gaps in pest and disease management.

As biological solutions continue to play a larger role in Canadian agriculture, Novonosis and FMC remain committed to science, integrity, and their Canadian roots to move the industry forward.



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.

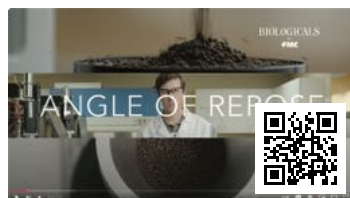
Watch the Crush Strength Test Video.



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.

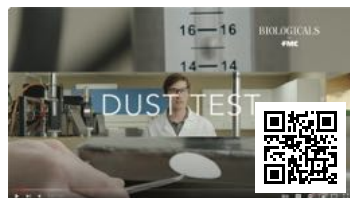
Watch the Flowability Test Video.



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.

Experience the full benefits of TagTeam® BioniQ® with this enhanced granule now available through your local FMC retailer.

LCO Promoter Technology™ – 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 Promoter Technology™ comes in, giving plants the boost they need right from day one.

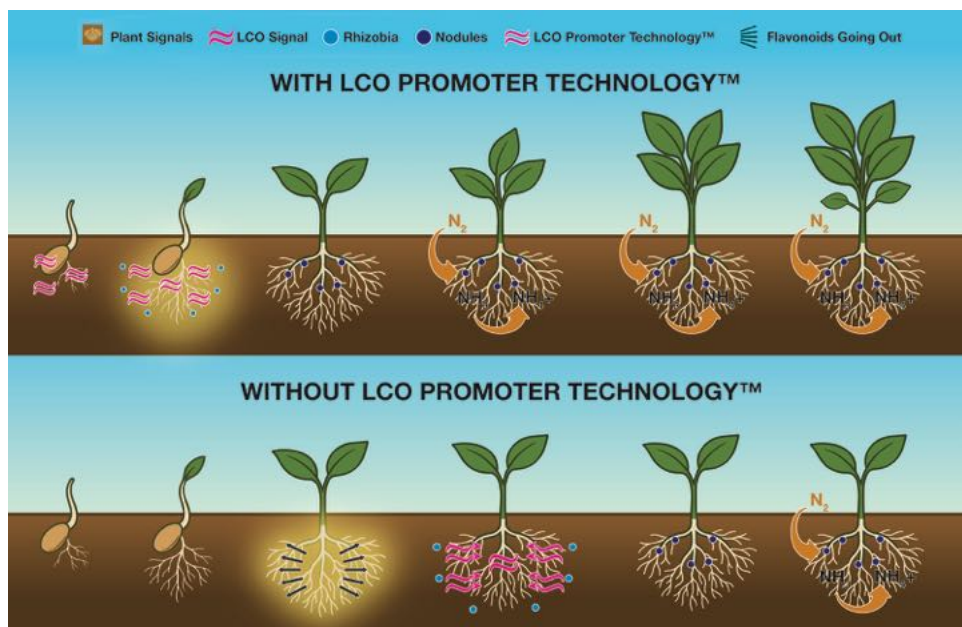
What is LCO?

LCO stands for lipo-chitooligosaccharide, which is a naturally occurring signaling 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 help fix nitrogen. Once they get the message, rhizobia sends back an LCO signal that tells the plant that they are a match and signals to the plant to start preparing for the rhizobia to enter.

By applying LCO Promoter Technology™ right at seeding, 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.



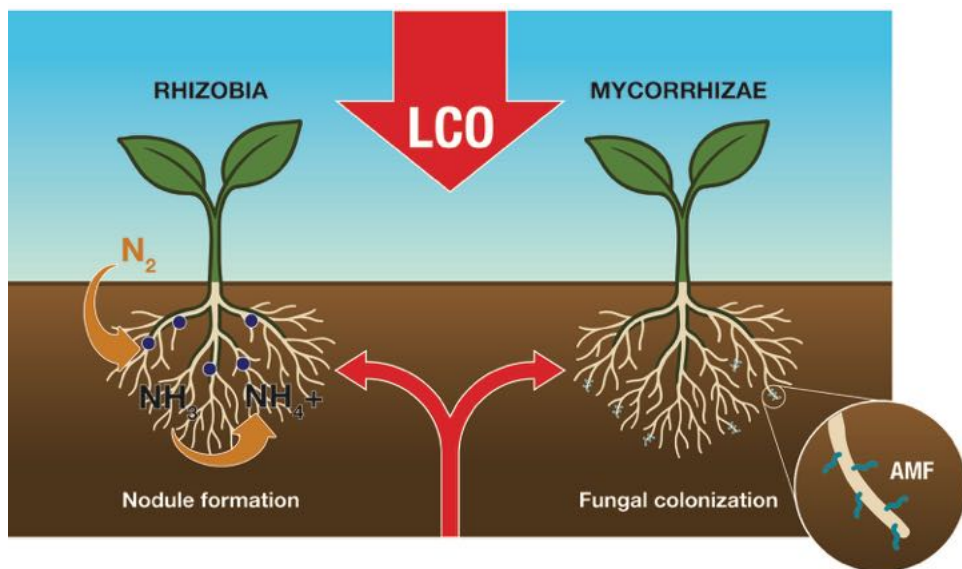
How LCO Supports Mycorrhizal Fungi

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.

LCO Promoter Technology™ – Helping Plants Start Strong and Finish Stronger

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.

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



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 Promoter Technology™ helps plants 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 Promoter Technology™

LCO Promoter Technology™ 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 Promoter Technology™

- Kickstarts nodulation in legumes like lentil, pea and chickpea
- Speeds up colonization of mycorrhizal fungi in pulses and cereals
- 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 Promoter Technology™

- Improves plant energy and biomass
- Enhances internal sugar production
- Produces greater microbial activity in the root zone
- Attracts more rhizobia and mycorrhizal fungi via the roots

Crop-by-crop Snapshot of Synergy With Rhizobia Bacteria

Crop	Ability to Fix Nitrogen	% of Required Nitrogen Fixed by Crop	Key Benefits of Enhanced Nodulation and Nitrogen Fixation
Faba Bean	Strong	~88% ¹	Increases seed size and overall biomass
Soybean	Medium	50 – 60%	Improved protein content, early nodulation, drought tolerance
Pea	Medium	~ 56% ¹	Enhanced root development, reduced lodging risk
Chickpea	Medium	~ 56% ¹	Better nodulation in alkaline soils, drought resilience
Lentil	Moderate	~ 54% ¹	Improved stand establishment, stress tolerance
Dry bean	Low to moderate	~ 38% ¹	More even maturity, helps reduce fertilizer need

¹Source: Dr. Fran Walley, University of Saskatchewan

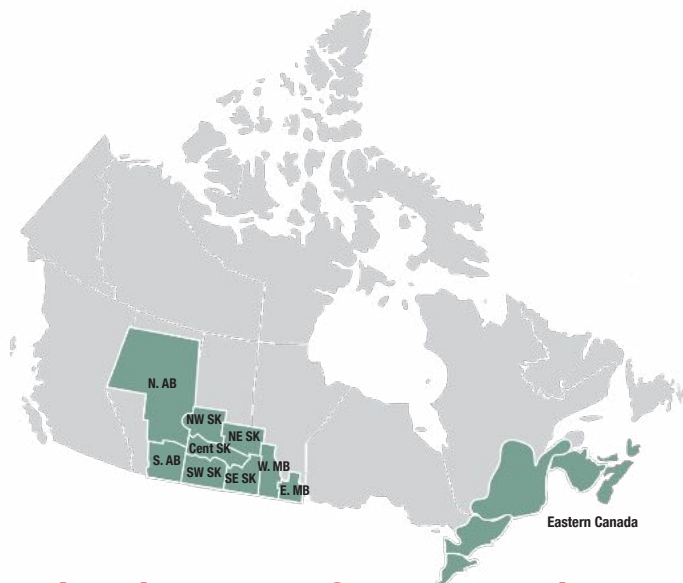
Get More From Every Acre With LCO Promoter Technology™

Crop-by-crop Snapshot of Mycorrhizal Benefits

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
Oats	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.





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BIOLOGICALS

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