

FERTILIZER'S PERFECT COMPLEMENT

BioPath®
BIOLOGICAL FERTILIZER COMPLEMENT

FROM



BioPath® is a biological fertilizer complement from Mosaic formulated with proven strains of PGPR — Plant Growth Promoting Rhizobacteria — that increases nutrient availability, uptake and utilization and improves early season plant growth and vigor optimizing yield potential in corn.

BIOPATH AT WORK

BioPath contains select, highly effective strains of spore-forming *Bacillus* bacteria (PGPR) colonize in and around developing corn roots and promote positive plant growth responses.

Increased nutrient availability.

The select strains of *Bacillus* in BioPath produce organic acids and enzymes that improve the solubilization of fertilizer into plant-available forms.

Improved nutrient uptake and utilization.

BioPath helps harness soil nutrients so corn plants have the nutrition they need at peak uptake times throughout the season, particularly during the "Corn Sprint" — the mid-season, rapid growth period that generally runs from V6 to R3.

More robust roots.

The microbes in BioPath promote vigorous root growth and development via the production of plant growth promoting compounds.

Increase ROFI and optimize yield potential.

Better nutrient efficiency combined with greater early season corn plant growth and vigor can increase the return on fertilizer investments and optimize yield potential.

NOT YOUR AVERAGE BIOLOGICAL

Not all biological products are created equal, and there can be confusion when evaluating product performance. Individual bacterial strains can elicit specific plant growth responses — or not. BioPath uses *Bacillus* strains that have been carefully screened and selected for their ability to form symbiotic relationships with corn roots to improve nutrient availability, uptake and season-long use.

BIOPATH OFFERS THREE DISTINCT ADVANTAGES OVER COMPETITIVE PRODUCTS:

Ease of Use.

BioPath is compatible with most liquid fertilizers and crop protectants, has no special storage conditions, and has a 24-month shelf-life. It also has a shelf-life of up to 18 months in fertilizer blends, ensuring it's ready to go when your customers are.

Consistent Performance.

The strains of *Bacillus* bacteria in BioPath, their modes of action and use rates are well-understood. BioPath has consistently performed in research trials, with over an 80% win rate.

Economics.

BioPath's cost per acre is at or below the industry standard. Coupled with a yield advantage ROI of over 3 to 1 makes it an economical way to improve return on fertilizer investment.

FLEXIBLE APPLICATION

BioPath is a safe, simple and convenient complement to most liquid fertilizer programs. It is compatible with starters, UAN and most crop protectants.

Rate recommendations

Stand-alone application
Starter or Sidedress: 16 oz. per acre

AS INGREDIENT

Fertilizer Rate	Incorporation Rate
UAN @ 40 GPA	0.3%
UAN @ 20 GPA	0.5%
UAN @ 10 GPA	1.0%
Starter @ 5 GPA	2.0%
Starter @ 3 GPA	3.5%

APPLY AT PLANT OR WITH SIDEDRESS NITROGEN

PROVEN PERFORMANCE

Sidedress application of BioPath at 16 oz. per acre increased corn yield by an average of 3.7 bu/A with over an 80% positive response, providing over a 3 to 1 ROI.

In-season evaluations in 2021 showed statistically significant increases in total uptake of phosphorus and micronutrients and a numerical increase in total uptake of nitrogen, potassium and secondary nutrients. **By increasing the amount of crop nutrient uptake from the fertilizer already applied, BioPath allows growers to capture almost \$9.00/A of additional fertilizer investment.**

PRODUCT DETAILS

Mode of Action

Nutrient solubilization and cycling to improve plant macronutrient and micronutrient availability.

Fertilizer Compatibility

Effective with a wide range of raw nutrients, blends and organic solutions. Contact a Mosaic representative for a complete list of compatible fertilizers.

Active Ingredients

Bacillus subtilis (2 x 10⁸ cfu/ml)
Bacillus methylotrophicus (2 x 10⁸ cfu/ml)
Bacillus licheniformis (1 x 10⁸ cfu/ml)

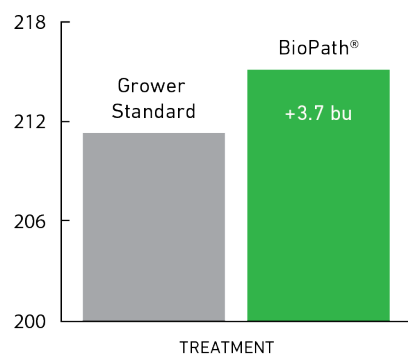
Shelf Life

24 months in concentrate
Up to 18 months in fertilizer

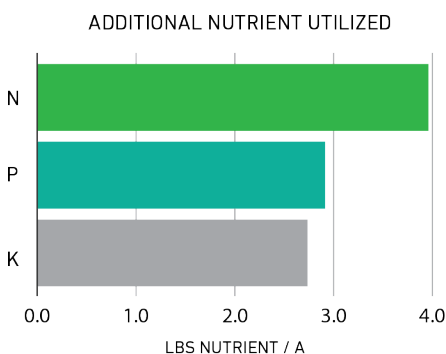
Packaging

2 x 2.5-gallon case
275-gallon tote

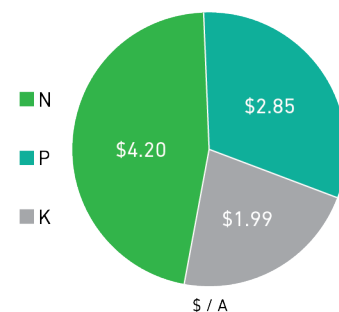
BioPath Optimizes Yield Potential



Increase Return on Nutrient Investments with BioPath



ADDITIONAL INVESTMENT UTILIZED



Learn More at AmplifyYourROFI.com

Additional nutrient utilized calculated using typical corn fertilizer rates in the USA (180 N, 90 P, 160 K), multiplied by the treatment effect increases in total nutrient uptake of 2.2% for N, 3.2% for P and 1.7% for K. Nitrogen \$ utilized calculated using UAN32 \$444/ton, Phosphorus \$ utilized calculated using MAP \$800/ton, Potassium \$ utilized calculated using Potash \$647/ton. <https://www.dtnpf.com/agriculture/web/ag/crops/article/2021/10/06/fertilizer-price-gains-losing-steam>.

Application Rates

BIOPATH AGRICULTURE APPLICATIONS		
CROPS	METHOD OF APPLICATION	APPLICATION RATE (US / METRIC)
Berries and Small Fruits: Blackberries, Blueberries, Currants, Elderberries, Gooseberries, Huckleberries, Loganberries, Raspberries, Strawberries, Grapes	Pre-Plant Application	16 oz - 32 oz in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water/ 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha every two to four weeks through growing season
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Bulb Vegetables: Garlic, Leeks, Onions, Shallots, Ornamental Bulbs	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well – inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well – inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray
Cereal Grains: Buckwheat, Corn (grain, seed, sweet corn, silage, popcorn, high oil), Rye, Wheat, Sorghum, Millet, Oats, Alfalfa	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Citrus Fruits: Citrus Hybrids, Grapefruit, Kumquat, Limes, Oranges, Pummelos	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha monthly through drip or microjet
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material
Conifer Tree Seedlings, Conifer Trees	In-Furrow	Apply 16 oz - 32 oz / 1.2 L – 2.3 L in sufficient amount of water to inoculate 1 ac/ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material

CROPS	METHOD OF APPLICATION	APPLICATION RATE (US / METRIC)
Cucurbit Vegetables: Cucumbers, Melons, Musk Melons, Gourds, Pumpkins, Squash	Pre-Plant Application	For application when preparing seed bed – Inject 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha through drip or with pre-plant herbicide
	At-Plant Application	Apply 32 oz of product per acre / 2.3 of product per ha with transplant water
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha through drip
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre foliarly / 1.2 L – 2.3 L of product per ha
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Fruiting Vegetables: Eggplant, Sweet and Hot Peppers, Tomatillos, Tomatoes	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	At-Plant Application	Apply 32 oz of product per acre with transplant water
	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
Herbs, Spices, and Mints:	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
Hydroponic Crops:	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Substrate Mix	Mix 16 oz – 32 oz per cubic yard / 750 mL to 1,500 mL per cubic meter of substrate
Leafy and Brassica (Cole) Leafy Vegetables: Arugula, Celery, Chervil, Endive, Fennel, Lettuce (head and leaf), Parsley, Radicchio, Rhubarb, Spinach, Swiss Chard, Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi, Mustard Greens Asparagus:	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
Legume Vegetables (Succulent or Dried): Beans (soybean, snap, dry), Lentils, Peas	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Oilseed Crops: Cotton, Canola, Safflower, Sunflower	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Peanuts:	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha with rhizobia inoculant
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha

CROPS	METHOD OF APPLICATION	APPLICATION RATE (US / METRIC)
Pome Fruits: Pears, Quince, Apples	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material
Root and Tuber Vegetables: Beets, Sugar Beets, Carrots, Celeriac, Chicory, Horseradish, Parsnip, Radish, Salsify, Turnips Potatoes, Sweet Potatoes, Yams, Jerusalem Artichoke, Cassava, Ginger	Pre-Plant Application	16 oz. - 32 oz. in 35 to 50 gals of water per acre / 1.2 L – 2.3 L in 325 to 475 L of water per ha to allow soil saturation
	In-Furrow	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Banded	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	18 months	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
Shadehouse and Outdoor Nursery Crops: Deciduous trees (Maple, Oak, ect.), Ornamentals, Grapes, Citrus, Pine	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material
Stone Fruits: Apricots, Cherries, Nectarines, Peaches, Plums, Prunes	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material
Tree Nuts: Almonds, Beech Nuts, Brazil Nuts, Butternuts, Cashews, Chestnuts, Filberts, Hickory Nuts, Macadamia Nuts, Pecans, Pistachios, Walnuts	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material
Tropical Fruits: Avocado, Mango, Papaya, Pineapple, Bananas, Plantains	Cuttings and Bare Root	32 oz - 64 oz in 50 gals of water / 1 L – 2 L in 200 L of water for dipping
	Fertigation	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Tank Spray Mix	Apply 16 oz – 32 oz of product per acre / 1.2 L – 2.3 L of product per ha
	Greenhouse and Nursery	Pre-mix 24 oz to 32 oz in 5 to 8 gals of warm water and agitate well - inject @ 1:100 dilution per 20,000 sq. ft. / 750 mL to 1,000 mL in 20 L to 30 L of warm water and agitate well - inject @ 1:100 dilution per 2,000 sq. m. and apply through drip or spray monthly
	Transplant Drench	Mix 24 oz to 32 oz in 50 gals of water / 750 mL to 1,000 mL in 200 L of water and soak root ball prior to backfilling hole. Utilize 1 quart (32 oz) of finished product to 5 gals of plant material / 1 L of finished product to 20 L plant material.

Amendment Application:	Method of Application:
Improves poor soil conditions, preparing the soil for plant development; Apply where soils have traditional pH issues, where soils have low CEC, where soils lack organic matter; where soils have lack of percolation, where soils have lack of water holding capacity	<ul style="list-style-type: none"> • Tank Mix – Mechanically Applied • Fertigation • Substrate Mix
At Planting Application:	Method of Application:
Populates the beneficial microbes in the rhizosphere where the root is first exposed to its growth environment. The environment where the critical plant – microbe symbiotic relationship is established; triggering germination; promotes faster and stronger rooting	<ul style="list-style-type: none"> • Cutting and Bare Root • In Furrow • Banded • Transplant Drench • Greenhouse and Nursery Application
Foundation Application:	Method of Application:
Apply at critical growth stages, supporting microbial growth patterns and populations allowing the beneficial microbial functions to continue to colonize the roots, improving root architecture, and rejuvenating soil structure	<ul style="list-style-type: none"> • Tank Mix – Mechanically Applied • Fertigation • Greenhouse and Nursery Application
Maintenance Applications:	Method of Application:
A continuation of supporting early stage applications; improve soil conditions, mineralize and hold nutrients, reinforcing the plant - microbial symbiotic relationship all the way through harvest	<ul style="list-style-type: none"> • Tank Mix – Mechanically Applied • Fertigation • Greenhouse and Nursery Application





Material Compatibility

This technical bulletin summarizes the compatibility of BioPath® with a number of liquid fertilizers, nutrient stabilizers and crop protectants. For material compatibilities not listed please contact mb.agronomy@mosaicco.com.

BIOPATH®

N-E
Nutrient Enhancer

BioPath Pre-Blend Compatibility Table

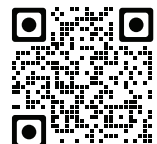
Material	Compatible	Shelf Life
Liquid Fertilizers		
9-5-13	yes	18 months
3-10-13	yes	18 months
0-0-15	yes	18 months
0-0-24	yes	18 months
10-34-0	yes	18 months
6-24-6	yes	18 months
3-18-18	yes	18 months
4-16-16	yes	18 months
11-16-0	yes	18 months
12-5-14	yes	18 months
12-3-5 + Trace Elements	yes	6 months
UAN32 (32-0-0)	yes	18 months
UAN28 (28-0-0)	yes	18 months
10-10-10	yes	18 months
UAN32 (32-0-0) + 0-0-15	yes	18 months
Nutrient Stabilizers		
UAN + Nitrpyrin (25.97%)	yes	6 months
UAN + NBPT (40.4%)	yes	12 months
UAN + NBPT (17.0%) + DCD (23.0%)	yes	12 months
Biostimulants		
Humates	yes	18 months
Kelp	yes	18 months
Molasses	yes	18 months

TANK MIXES

BioPath is tank-mix compatible in water with liquid fertilizers and most standard crop protectants for up to 48 hours. Avoid tank-mixing with copper fungicides and bactericides. When tank-mixing with liquid fertilizer or crop protectants, perform a Jar Test to assure compatibility with different mixtures of chemicals. It is typically recommended to mix in the following order: fertilizers, chemicals, water, BioPath. For support or site-specific compatibility information, please contact your product representative to determine compatibility.


TECHNICAL SUPPORT

Please contact a distributor near you, email mb.agronomy@mosaicco.com, or visit our website at croptnutrition.com for technical support. BioPath product compatibility is based on common industry management practices. All risks shall be assumed by buyer and user.



SAFETY DATA SHEET

SECTION 1	PRODUCT AND COMPANY IDENTIFICATION	
Trade Name:	BioPath® Microbial Inoculant	
Primary Use:	Microbial Inoculant to Encourage Nutrient Cycling and Root Development	
Company Information:	Corporate Headquarters	The Mosaic Company 101 East Kennedy Blvd, Ste 2500 Tampa, FL 33602
	US Guarantor	Mosaic Biosciences Headquarters 5 Lab Drive, Suite 3200 Durham, NC 27709 Production 111 E. Tever Street Plant City, FL 33563-2417
	Canada Guarantor	Mosaic Canada Crop Nutrition, LP 1700 – 2010 12th Ave. Regina, SK Canada S4P 0M3
	Contact Info	www.cropnutrition.com +1 (813) 718-7284 MBNAinfo@mosaicco.com
Emergency Telephone:	EMERGENCY OVERVIEW 24 Hour Emergency Telephone Number: For Chemical Emergencies: Spill, Leak, Fire or Accident Call CHEMTREC North America: (800) 424-9300 (reference CCN201871) Others: (703) 527-3887 (collect)	

SECTION 2	HAZARD IDENTIFICATION
OSHA/HCS Status:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). See appropriate classifications below.
GHS Classification:	SKIN IRRITATION - Category 2 EYE IRRITATION - Category 2A
	Signal Word: WARNING Hazard Statement(s) Causes skin irritation. Causes serious eye irritation.
Label Elements:	
Prevention:	Wear protective gloves. Wear eye or face protection. Wash hands thoroughly after handling.
Response:	Take off contaminated clothing and wash it before reuse. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.

SECTION 3 COMPOSITION INFORMATION ON INGREDIENTS			
Composition:	Component	CAS#	Percentage
	Bacillus licheniformis	n/a	<1%
	Bacillus methylotrophicus	n/a	<1%
	Bacillus subtilis	n/a	<1%
	Water Based Culture Medium	7732-18-5	99%

SECTION 4 FIRST AID MEASURES		
First Aid Procedures:	Eyes:	Move victim away from exposure and into fresh air. Flush eyes with plenty of clean water for at least 15 minutes. If symptoms persist, seek medical attention.
	Skin:	Wash contaminated area thoroughly with mild soap and water. If chemical or solution soaks through clothing, remove clothing and wash contaminated skin. If irritation develops and persists after washing, seek medical attention.
	Inhaled:	If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.
	Ingestion:	Rinse mouth thoroughly. If large amounts are swallowed, seek emergency medical attention.

SECTION 5 FIRE FIGHTING MEASURES	
Extinguishing Media:	Product is not flammable. Use extinguishing agent suitable for type of surrounding fire.
Protection of Firefighters:	Positive pressure, self-contained breathing apparatus is required for all firefighting activities involving hazardous materials.

SECTION 6 ACCIDENTAL RELEASE MEASURES	
Response Techniques:	Contain spill, absorb liquid with clay or other absorbent material. Sweep up and package appropriately for disposal.

SECTION 7 HANDLING AND STORAGE	
Handling:	Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Wash contaminated clothing or shoes. Use good personal hygiene practices.
Storage:	Use and store this material in dry, well-ventilated areas. Store only in approved containers. Keep container(s) tightly closed. Avoid excessive heat and direct sunlight.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION	
Engineering Controls:	Use process enclosure, general dilution ventilation or local exhaust systems where necessary to maintain airborne dust concentration below the OSHA standards or in accordance with applicable regulations.

Personal Protective Equipment (PPE):	Eye/Face:	Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended.	
	Skin:	Wear pants, shirt, shoes and socks. Gloves may be worn by individuals with sensitive skin.	
	Respiratory:	Under normal conditions, none required. If drift occurs, wear breathing apparatus	
	Other:	A source of clean water should be available in the work area for flushing eyes and skin.	
General Hygiene Considerations:	Wash thoroughly after handling Use adequate ventilation		
Exposure Guidelines:	OSHA Permissible Exposure Limits (PEL):	No OSHA TLV	

SECTION 9		PHYSICAL AND CHEMICAL PROPERTIES	
Appearance:	Dark brown or black solution (liquid)	Vapor Pressure (mm Hg):	Not applicable
Odor:	Characteristic fermentation odor	Vapor Density (air=1):	Not applicable
Odor Threshold:	No data available	Specific Gravity or Relative Density:	Not applicable
Physical state:	Liquid	Bulk Density:	1.13 ± 0.02 g/mL
pH:	5.6 – 6.8	Solubility in Water:	Soluble
Melting Point/ Freezing Point:	Not applicable	Partition coefficient:	No data available
Boiling Point:	212°F	Auto-Ignition Temperature:	Not applicable
Flash Point:	Not applicable	Decomposition Temperature:	Not applicable
Evaporation Rate:	No data available	Viscosity:	No data available
Flammability:	Not applicable	Volatility:	Not applicable
Upper/Lower Flammability or explosive limits	Not applicable		

SECTION 10	STABILITY AND REACTIVITY
Reactivity:	No specific test data related to reactivity available for this product.
Chemical Stability:	Stable under normal conditions. Must be kept dry.
Possibility of hazardous reactions:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to Avoid:	Extreme temperatures.
Incompatible Materials:	Strong acid & alkali, organic solvents and oxidizing agents
Hazardous Decomposition Products:	None

SECTION 11	TOXICOLOGICAL INFORMATION
No components of this product are listed as toxic or carcinogenic by NTP, IARC, or OSHA	

SECTION 12	ECOLOGICAL INFORMATION
Ecotoxicology:	This product is bio-degradable. Dispose of this product by diluting it with water and apply to soil, plants, turf, etc.

SECTION 13	DISPOSAL CONSIDERATIONS
	Recover or recycle if possible. Properly characterize all waste materials. Consult federal, state/provincial and local regulations for bacteria regarding the proper disposal of this material.

SECTION 14	TRANSPORT INFO
	Non-hazardous

SECTION 15	REGULATORY INFORMATION
	Not Applicable

SECTION 16	OTHER INFORMATION
Disclaimer:	<p>The information in this document is believed to be correct as of the date issued. HOWEVER, MOSAIC MAKES NO GUARANTEE, REPRESENTATION, OR WARRANTY, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO THE USE OF THIS PRODUCT.</p> <p>User is responsible for determining whether this product is fit for a particular purpose and suitable for user's method of use or application and assumes the risk of use thereof. The conditions and use of this product are beyond the control of Mosaic, and Mosaic disclaims any liability for loss or damage incurred in connection with the use or misuse of this product. Each user should review the recommended industrial hygiene and safe handling procedures in the specific context of the intended use and determine whether they are appropriate.</p>
Preparation:	The preparation of this SDS was in accordance with ANSI Z400.1-2010.
Revision Date:	June 7, 2023

BIOPATH[®]



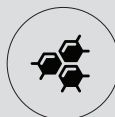
Biological Fertilizer Complement

NE

Nutrient Enhancer



Improves Plant
Growth & Vigor



Improves Nutrient
Use Efficiency



Fits Most Liquid
Applications

VOLUME
5 gal (2x2.5)/18.93 L

DENSITY
9.84 lbs/gal @ 68° F

NET WEIGHT
49.20 lbs/22.32 kg

● Compatible
with most crop
protectants

● Tank mix

● Pre-blend with
liquid fertilizer

● Row and specialty
ag crops

LOT#: _____ EXPIRATION DATE: _____

BIOPATH®

NE

Nutrient Enhancer

Biological Fertilizer Complement

PRODUCT BENEFITS

BioPath® is a biological fertilizer complement formulated with proven *Bacillus* strains that increases nutrient availability, uptake and utilization, and improving early season plant growth and vigor.

GUARANTEED ANALYSIS CONTAINS NON-PLANT FOOD INGREDIENTS

ACTIVE INGREDIENTS MICROORGANISMS

<i>Bacillus licheniformis</i>	1x10 ⁸ cfu/mL
<i>Bacillus methylotrophicus</i>	2x10 ⁸ cfu/mL
<i>Bacillus subtilis</i>	2x10 ⁸ cfu/mL

DIRECTIONS FOR USE

Starter or Sidedress – Apply 16 oz to 32 oz per acre. Mix with sufficient volume of water to achieve desired coverage.

Foliar Application – Apply 16 oz to 32 oz per acre. Mix with sufficient volume of water to achieve desired coverage.

Broadcast – Apply 64 oz per acre. Mix with sufficient volume of water to achieve desired coverage.

INGREDIENT SOLUTIONS

When enhancing bulk fertilizer, incorporate / blend BioPath® at 0.5% to 3.5% by volume.

FERTILIZER RATE	BIOPATH® INCORPORATION RATE
UAN @ 20 GPA	0.5%
UAN @ 10 GPA	1%
Starter @ 5 GPA	2%
Starter @ 3 GPA	3.5%

For crop specific application rates, refer to Application Methods, Rates & Frequency table provided or contact your Product Representative.

DO NOT USE BIOPATH® FOR DISEASE SUPPRESSION

STORAGE

Store product in original container with cap tightly secured. Store in a dry area (40° – 95° F | 4° – 35° C) out of direct sunlight.

Information regarding the contents and levels of metals in this product is available on the internet at: <http://www.aapfco.org/metals.html>

HEALTH AND SAFETY INFORMATION



WARNING. CAUSES SKIN IRRITATION CAUSES SERIOUS EYE IRRITATION

Wear protective gloves. Wear eye or face protection. Wash hands thoroughly after handling. Take off contaminated clothing and wash it before reuse. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention.

WARRANTY

IMPORTANT! READ the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this Product. Since weather, soil and other conditions may vary, neither Mosaic Biosciences, nor the Seller make a warranty of any kind, expressed or implied, concerning the use of this product and specifically disclaim and limit all warranties, remedies, and liabilities as permitted by law. The buyer/user assumes all risk of handling and use of this product. **THE CONDITIONS OF SALE AND LIMITATION OF WARRANTY (INCLUDING DISCLAIMERS, REMEDY, AND LIABILITY)** of this product are specifically set forth at www.MosWarranty.com.



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