



Biocatalyst  
Technology

Accomplish<sup>LM</sup>

**Extract**  
POWERED BY Accomplish

**TITAN**<sup>®</sup>  
XC 

*Biocatalyst Technology:*  
**Frequently Asked  
Questions**

## WHAT

### **What is biocatalyst technology?**

Loveland's biocatalyst products contain technology that is naturally derived, designed to increase nutrient availability from applied fertilizers, promote nutrient mineralization in the soil to increase existing nutrient availability, and support root growth through biochemical reactions with the plant.

### **What are Accomplish® LM and Titan® XC?**

Accomplish LM and Titan XC are fertilizer biocatalysts distributed by Loveland Products through Nutrien Ag Solutions. Accomplish LM and Titan XC help growers enhance the performance of their fertilizers in the soil system and get the most out of their fertility programs. Accomplish LM is specifically formulated for use with broadcast spray applications (including liquid fertilizers and crop protection products) and in-furrow or banded applications. Titan XC is specifically formulated for use with dry fertilizer blends. For an "At a Glance" look at each product, please see pages 9 and 11.

### **What is Extract Powered by Accomplish™ (Extract PBA)?**

Extract PBA (6-0-0-13S) is a biocatalyst specifically formulated to maximize nutrient release from a grower's existing fertilizer investment. It combines the powerful biochemistry of Accomplish LM with the C:N ratio-balancing power of ammonium thiosulfate (ATS) to accelerate nutrient release through expedited nutrient cycling, allowing the nutrients to re-enter the soil profile for the next crop's use. For an "At a Glance" look at Extract PBA, please see page 10.

## What are the benefits of incorporating these biocatalyst products into my existing fertilizer program?

Benefits of Accomplish LM and Titan XC include:

- Increased nutrient availability
- Improved plant performance
- Enhanced nutrient use efficiency
- Better root growth and development
- Outstanding potential ROI

Benefits of Extract PBA include:

- Maximizes nutrient release from soil and crop residues
- Accelerates residue breakdown
- Supports easier plantability in the spring
- Promotes more even crop emergence
- Optimizes yield potential for next season's crop

Product benefits are seen over a broad range of plant types, soil types, and application methods. Growers who incorporate biocatalyst technology into their programs often see improved yield responses and increased fertilizer efficiency, year after year.

## What is the “best” application for my fields?

Each grower's existing fertility practices should be considered for the best possible ROI.

## WHAT

### What are the recommended application rates?

#### Spring Season

##### Accomplish LM

- Apply 1-2 pints per acre with starters, 1-2 quarts per acre broadcast with UAN and other liquid fertilizers, or 2-3 quarts per acre with manures or poultry litter
- Apply 1-2 quarts per acre with sidedress UAN

##### Extract PBA

- For pre-emergent applications, apply 1-2 gallons per acre; adding at least 1 gallon of UAN is recommended; can be mixed with glyphosate, other herbicides and liquid broadcast fertilizers

##### Titan XC

- Apply 16-32 ounces per ton on P & K fertilizers, MESZ, MES, pell lime, sulfate of potash, ammonium sulfate, & gypsum

#### Fall Season

##### Accomplish LM

- Apply 2-3 quarts per acre broadcast on corn residue or on fields where poultry litter or manure has been applied
- Accomplish LM can be tank mixed with burn down or pre-emergent chemistry

##### Extract PBA

- For residue applications, apply 1-2 gallons per acre and add at least 1 gallon of UAN

##### Titan XC

- Apply 16-32 ounces per ton on P & K fertilizers, MESZ, MES, pell lime, sulfate of potash, ammonium sulfate, & gypsum

*Please also see "Uses and Rates" on pages 12-14.*

## How do the products work?

Accomplish LM improves the availability and uptake of nutrients from fertilizers and soil nutrient sources. It also increases root size and branching, so that more of the root system can take up nutrients and water. Roots also respond to Accomplish LM by directly increasing nutrient uptake, and by influencing plant-microbe interactions in the soil to make nutrients more available to the plant.

Extract PBA combines Accomplish LM with ATS to speed nutrient cycling and residue breakdown—returning nutrients to the soil profile for uptake by the next crop.

Titan XC accelerates and increases the breakdown of treated dry fertilizers. This makes nutrients more available for plant uptake and utilization.

Please see “How It Works” for each product on pages 5-7.

## How do I apply the products?

These biocatalyst products are compatible with most fertilizers, herbicides, insecticides and fungicides. They can be easily incorporated into a grower’s current fertilizer program – without requiring product-specific equipment or a special trip across the field.

Accomplish LM can be applied with starters or pop-up fertilizers, sidedressed or broadcast with UAN 28 or 32, or tank mixed with burn down or pre-emergent chemistries.

Extract PBA can be applied directly on crop residues or mixed with glyphosate, other herbicides and liquid broadcast fertilizers as part of a pre-emergent application.

Titan XC can be applied to the entire blend of dry fertilizer (P & K) using a vertical, volumetric (horizontal), or rotary (drum) blender.

## How long do the products last after application?

Biocatalyst products have season-long activity.

## How quickly do the products start working?

Biocatalyst products start working within 30 days of application and are effective across a variety of soil and crop types.

## How often should the products be applied?

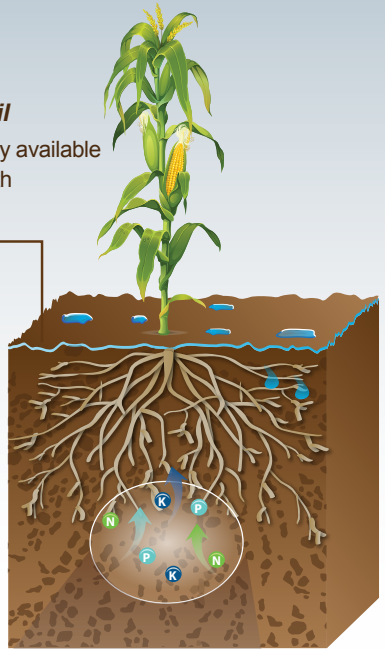
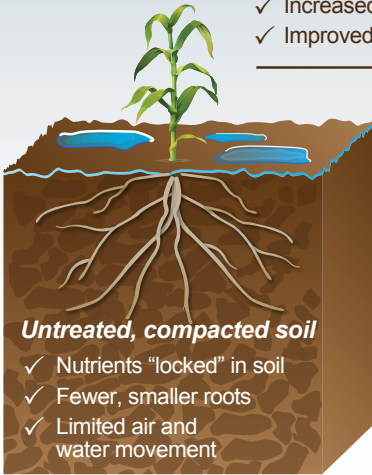
For optimal results, growers should apply the products whenever they are applying fertilizer.

# How It Works:

## Accomplish<sup>LM</sup>

### Treated, healthy soil

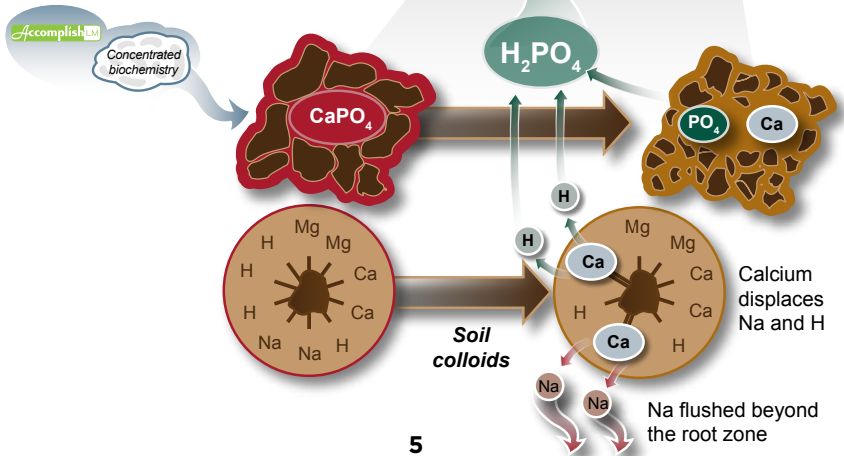
- ✓ More nutrients readily available
- ✓ Increased root growth
- ✓ Improved soil tilth



**1** Accomplish LM Applied to Soil

**2** Nutrient Mineralization

**3** Nutrients "Unlocked"





# How It Works:

# Extract

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## Untreated Residue:

- ✓ Slow process of residue breakdown
- ✓ Valuable nutrients remain locked in residue
- ✓ Applied nutrients less available for plant due to N immobilization

## With Extract PBA:

- ✓ Nutrients more quickly released and available for the next crop to use
- ✓ Rapid residue breakdown, even in cooler temperatures
- ✓ Easier plantability, more even emergence, and strong, healthy plants

Possibility for uneven or slow emergence and other consequences of nutrient tie up

Healthier plant and greater nutrient efficiency for the grower

Slow, temperature-dependent breakdown may immobilize nutrients

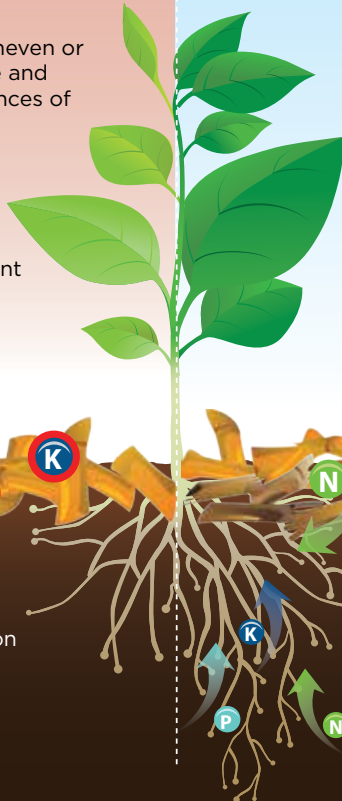
Increased nutrient cycling

Nutrients locked up in soil or residue

Immobilization of applied N

Improved nutrient mineralization

More nutrients available for plant uptake during growing season



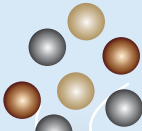
# How It Works:

# TITAN<sup>®</sup>

XC 

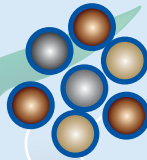
**1**

Untreated fertilizer applied to soil



**1**

Dry fertilizer treated with Titan XC applied to soil



**2**

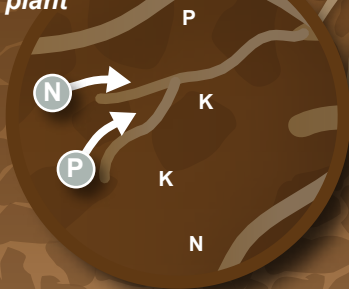
Titan XC accelerates the breakdown of dry fertilizer

*Less breakdown of dry fertilizer*

**2**

**3**

*Fewer nutrients taken up into plant*

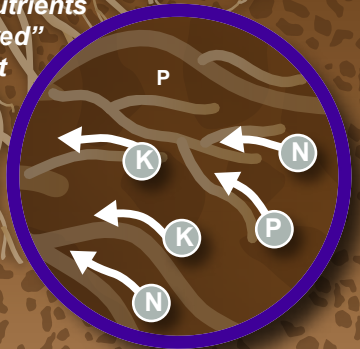


**3**

*More nutrients available sooner*

**4**

*More nutrients "captured" by plant*





## WHEN

### **When should I use Accomplish LM, Extract PBA or Titan XC?**

These biocatalyst products can be incorporated into growers' standard fertility programs year-round. Please speak to your local Loveland Products proprietary products manager (PPM) or Nutrien Ag Solutions retailer about which product is right for your current growing program.

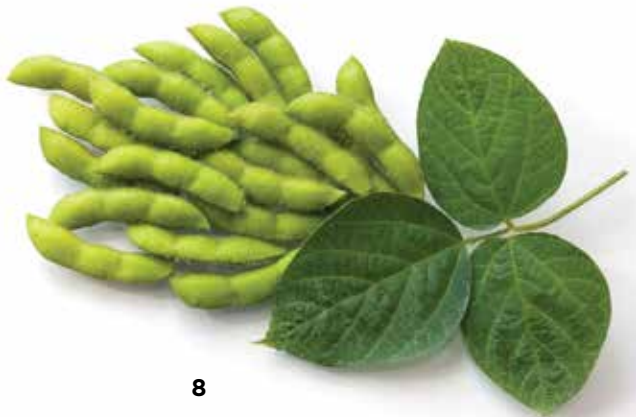
## WHERE

### **Where can I purchase Accomplish LM, Extract PBA or Titan XC?**

Accomplish LM, Extract PBA and Titan XC are distributed by Loveland Products through Nutrien Ag Solutions. Please talk to your Nutrien Ag Solutions branch if you are interested in purchasing these products.

### **Where can I learn more about these products?**

Additional information on Loveland Products' complete line of high-performance crop input products, including Accomplish LM, Extract PBA and Titan XC, can be found by visiting [www.lovelandproducts.com](http://www.lovelandproducts.com) or by speaking to your local Nutrien Ag Solutions retailer.



## Accomplish LM at a Glance

Application	<ul style="list-style-type: none"><li>• Liquid fertilizers and broadcast</li></ul>
Target nutrients	<ul style="list-style-type: none"><li>• Broad spectrum</li></ul>
Key functioning components	<ul style="list-style-type: none"><li>• Concentrated biochemistry</li></ul>
Primary mode(s) of action	<ul style="list-style-type: none"><li>• Mineralizes nutrient sources to increase nutrient availability</li><li>• Enhances root growth &amp; improves nutrient &amp; water uptake</li></ul>
Features	<ul style="list-style-type: none"><li>• Effective in a wide variety of soil types</li><li>• Compatible with a wide variety of liquid fertilizers, herbicides, fungicides, &amp; other chemicals</li><li>• Shelf stable</li><li>• Registered organic by California Department of Food &amp; Agriculture (CDFA) and Washington State Department of Agriculture (WSDA)</li></ul>

## Extract PBA at a Glance

Application	<ul style="list-style-type: none"><li>• Broadcast applications</li></ul>
Key ingredients	<ul style="list-style-type: none"><li>• Accomplish® LM biocatalyst</li><li>• Ammonium thiosulfate (ATS)</li></ul>
Features	<ul style="list-style-type: none"><li>• Labeled for residue and pre-emergence applications</li><li>• Accelerates residue breakdown</li><li>• Maximizes nutrient release from crop residue</li><li>• Supports easier plantability in the spring</li><li>• Promotes more even crop emergence</li><li>• Compatible with liquid broadcast fertilizers</li><li>• Compatible with glyphosate and other herbicides</li></ul>

## Titan XC at a Glance

Application	<ul style="list-style-type: none"><li>• Dry fertilizer impregnation</li></ul>
Target nutrients	<ul style="list-style-type: none"><li>• Broad spectrum</li></ul>
Functioning components	<ul style="list-style-type: none"><li>• Concentrated biochemistry</li></ul>
Primary mode of action	<ul style="list-style-type: none"><li>• Increases mineralization &amp; availability of nutrients in dry fertilizer blends</li></ul>
Features	<ul style="list-style-type: none"><li>• Effective in a wide variety of soil types</li><li>• Compatible with P &amp; K fertilizers, MESZ, MES, pell lime, sulfate of potash, ammonium sulfate, &amp; gypsum</li><li>• Shelf stable</li></ul>



## Uses and Rates

Application	Recommended Rate
Manure	2-4 quarts/acre (injected or applied broadcast)
Broadcast	2-4 quarts/acre
Residue	2 quarts/acre (with 1-2 gallons of 28% or 32% UAN + 8.5 gallons of water)
Starter	1-4 pints/acre
28% or 32% UAN	1-2 quarts/acre



# Extract

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## Uses and Rates

Application	Recommended Rate
Pre-emergent	<ul style="list-style-type: none"><li>• Apply at 1-2 gallons/acre</li><li>• Can be mixed with glyphosate, other herbicides and liquid broadcast fertilizers</li><li>• Recommended: Add at least 1 gallon of UAN</li><li>• Minimum spray solution volume: 10 gallons/acre</li></ul>
Residue	<ul style="list-style-type: none"><li>• Apply at 1-2 gallons/acre</li><li>• Add at least 1 gallon of UAN</li><li>• Minimum spray solution volume: 10 gallons/acre</li></ul>

*NOTE: DO NOT use in furrow or 2x2 at planting.*





## Uses and Rates

Dry Fertilizer	Recommended Rate
Phosphate (MAP 11-52-0, DAP 18-46-0, MES, MESZ) blends, potassium blends, sulfate of potash (SOP), ammonium sulfate (AMS), pell lime, gypsum and blends with urea	16-32 ounces/ton

## Contact Your Nutrien Ag Solutions Retailer

### Loveland Products, Inc.

3005 Rocky Mountain Ave.  
Loveland, CO 80538  
(970) 685-3300  
[www.lovelandproducts.com](http://www.lovelandproducts.com)



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