

# Stronger Results, Less Hassle: How Premix Herbicides Improve Weed Control

The Syngenta logo is displayed in white text on a dark green horizontal bar. The word "syngenta" is in a lowercase, sans-serif font, with a small leaf icon above the letter 'a'.

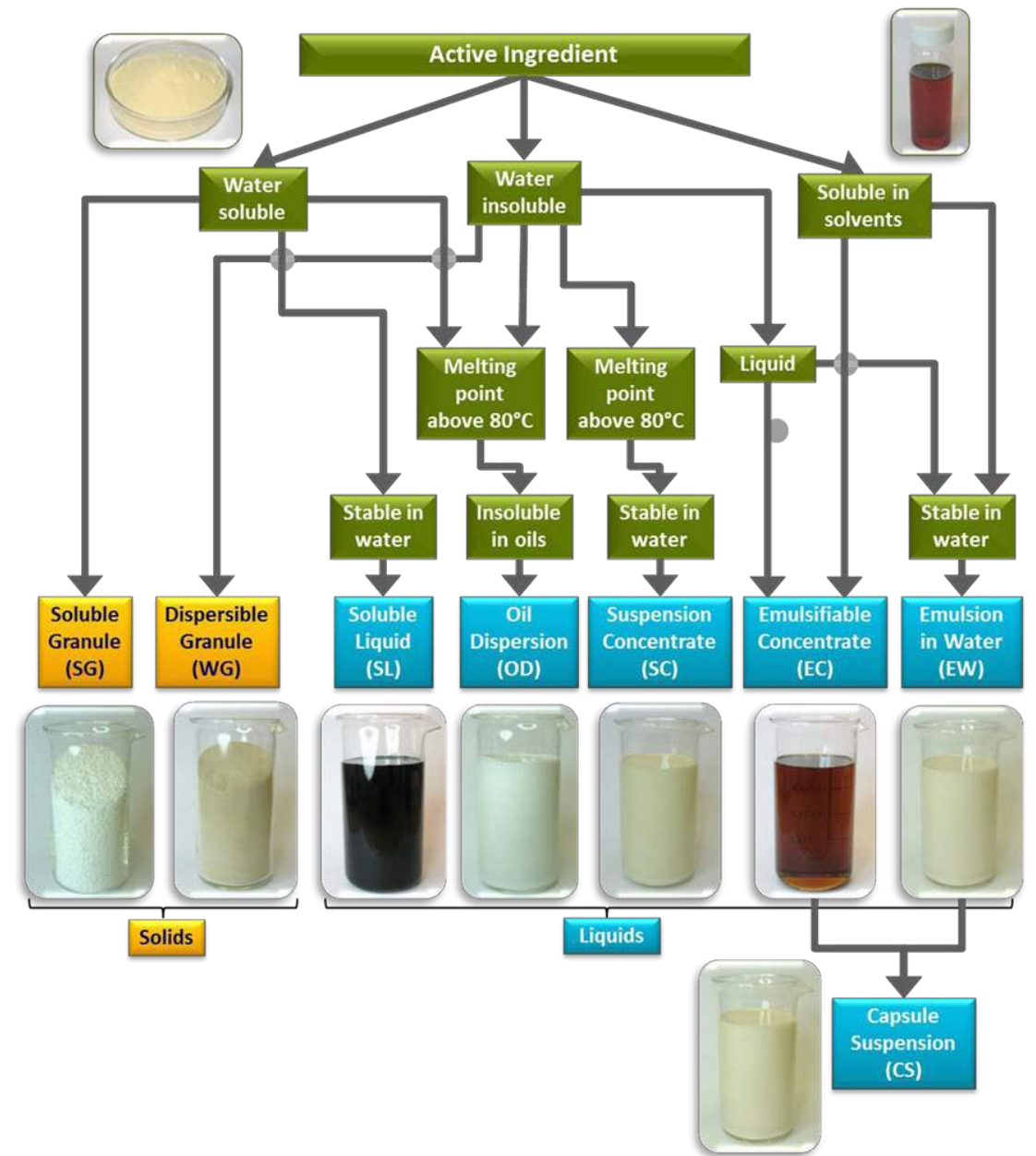
syngenta

2026 NAICC Annual Meeting  
Orlando, FL  
January 29th

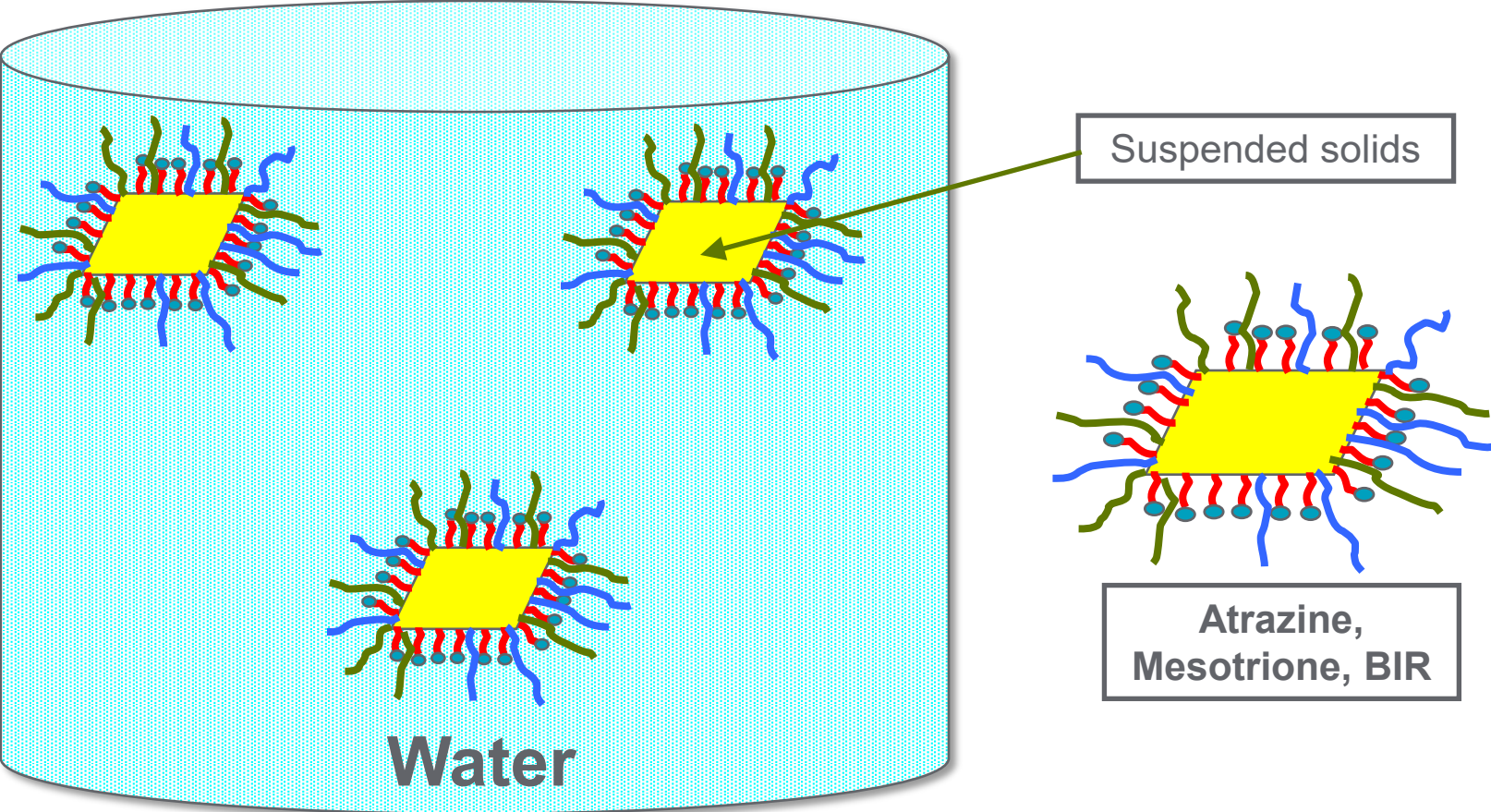
Brent Besler – Agronomic Service Representative

# Key Formulations

- Soluble Granule (SG)
- Dispersible Granule (DG)
- Soluble Liquid (SL)
- Oil Dispersion (OD)
- Suspension Concentrate (SC)
- Emulsifiable Concentrate (EC)
- Emulsion in Water (EW)
- Caspule Suspension (CS)



# SC Formulations (i.e., Aatrex, Bicep II Magnum)

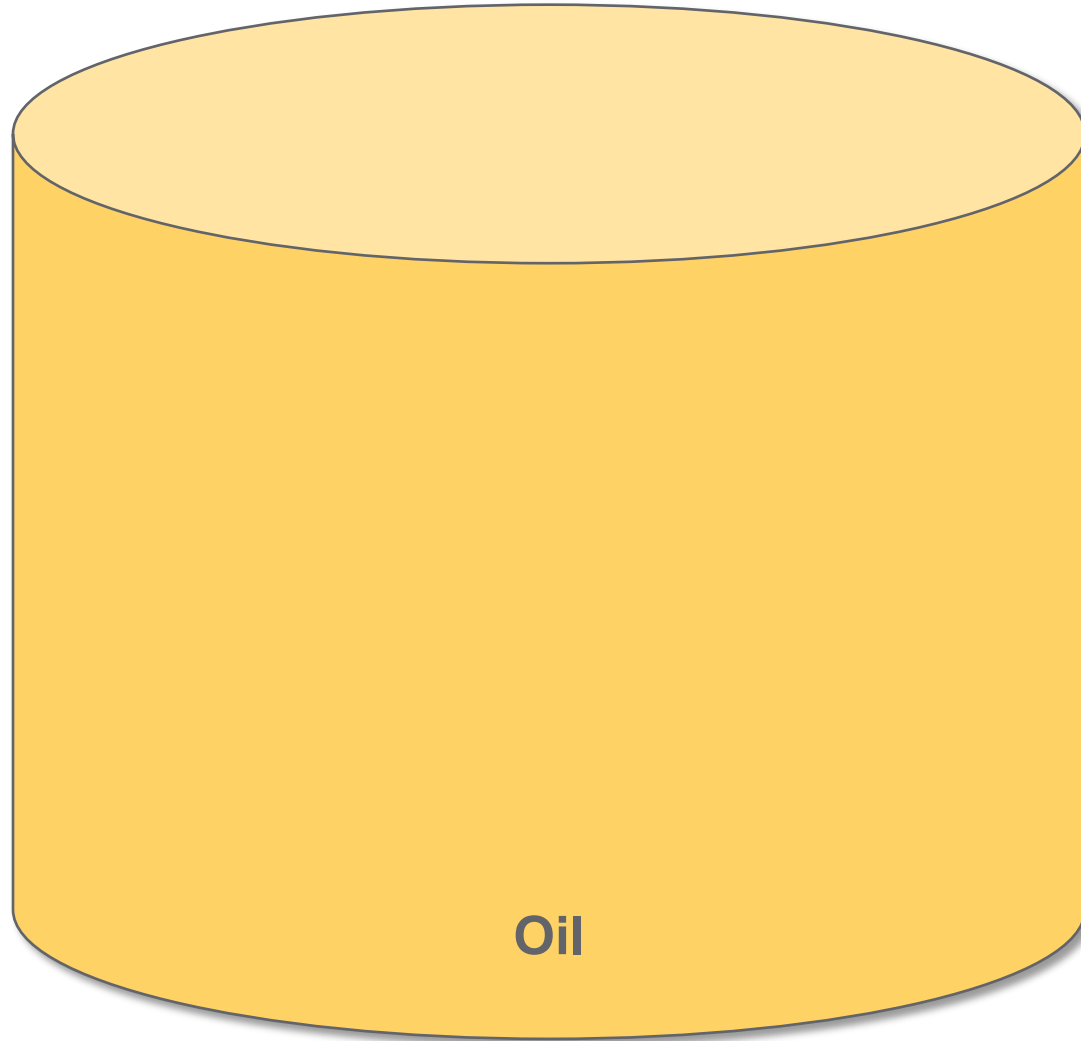


**Description:** A formulation containing solid particles (crystals) of active ingredient that are suspended in a liquid, typically water.

©2023 Syngenta. **Important:** Always read and follow label instructions. Some crop protection products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Acuron®, Bicep II Magnum®, Bicep II Lite Magnum®, Callisto® Xtra, Lexar® EZ, Lumax® EZ are Restricted Use Pesticides. Results may vary by geography. All photos are the property of Syngenta unless otherwise noted. Trademarks are the property of a Syngenta Group Company or of their respective owners.

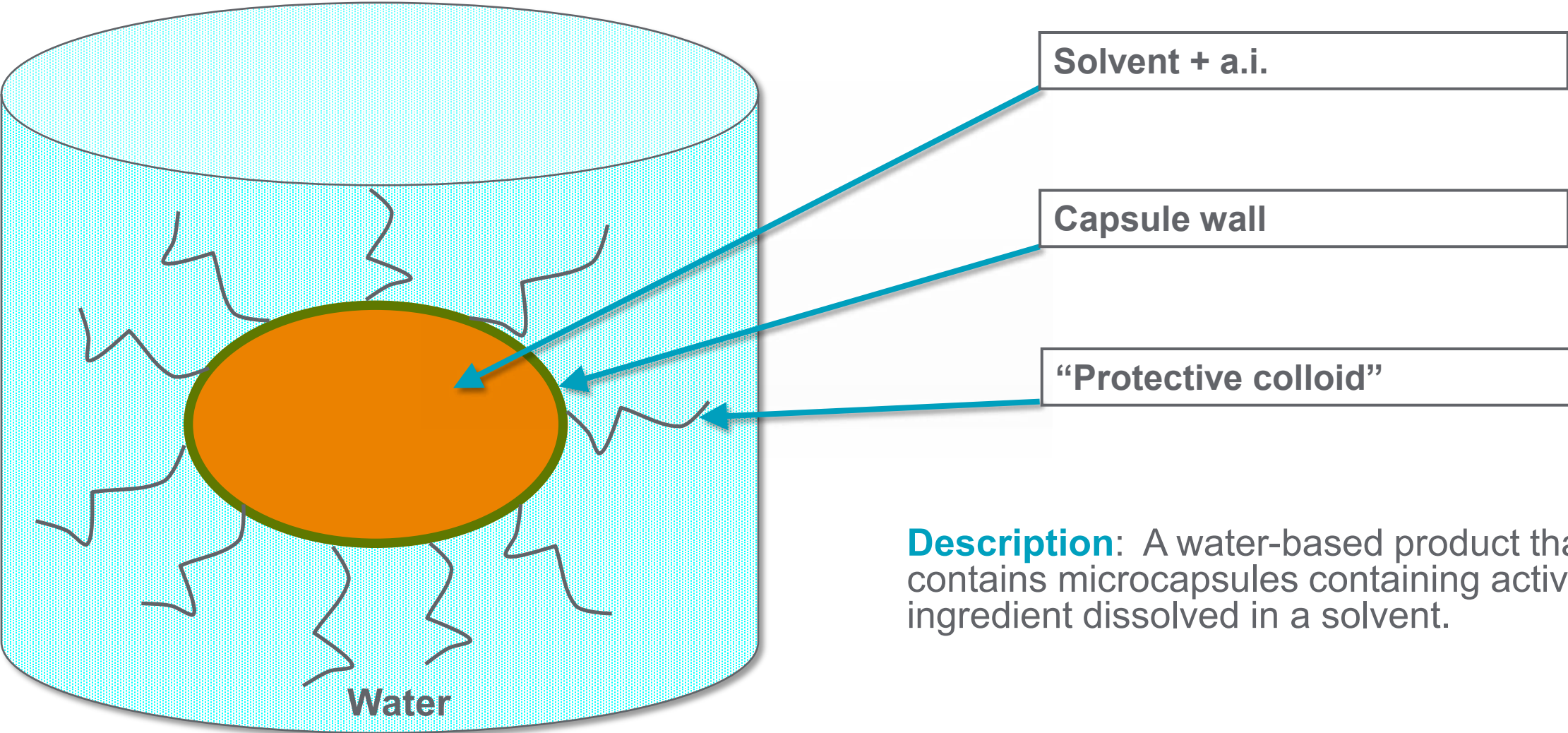


# EC Formulations (i.e., Dual II Magnum)



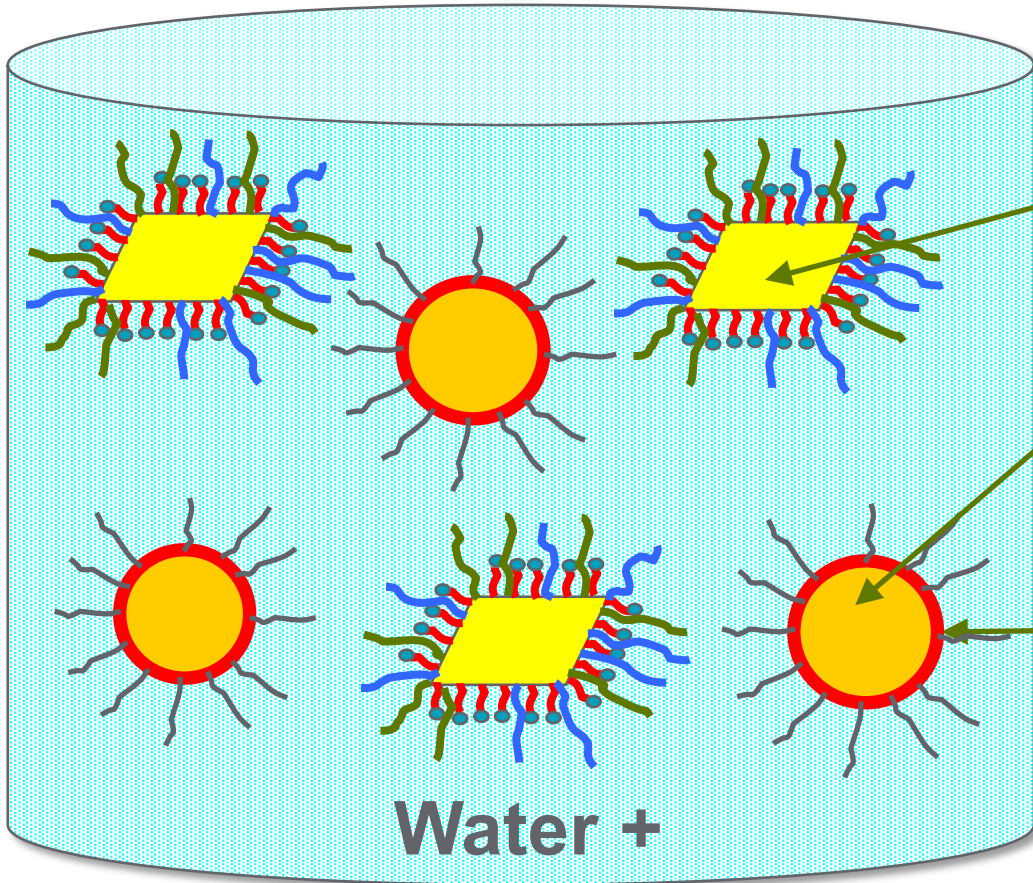
**Description:** A solvent-based formulation that forms an oil-in-water emulsion spontaneously upon dilution in water. **All** ingredients are **dissolved** in the solvent.

# CS Formulations (i.e., Warrior II with Zeon Technology)



**Description:** A water-based product that contains microcapsules containing active ingredient dissolved in a solvent.

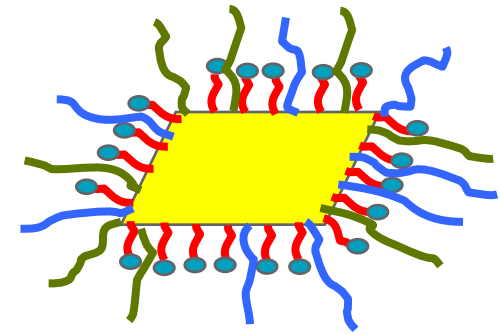
# ZC Formulations (i.e., Acuron®)



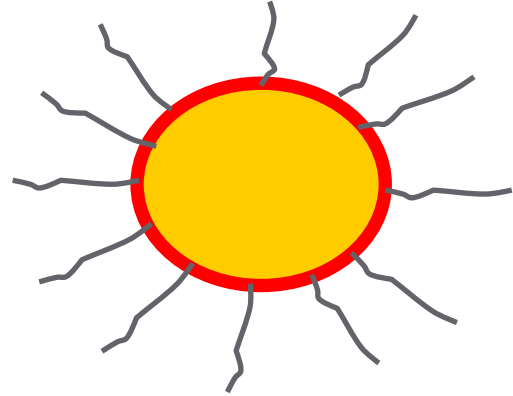
Suspended solids

Solvent + active ingredient

Capsule wall



Atrazine,  
Mesotrione, BIR



SMOC Capsule  
Suspension

# Herbicide Building Blocks

Bicep II Magnum



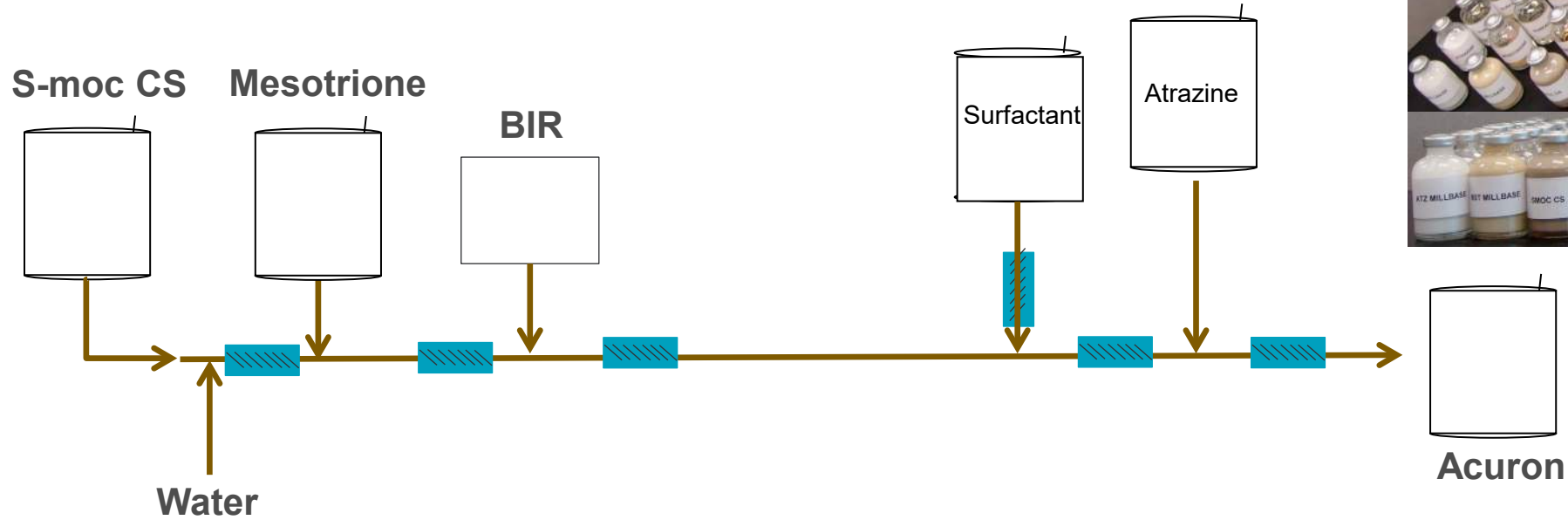
Acuron



©2023 Syngenta. Important: Always read and follow label instructions. Some crop protection products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Acuron®, Bicep II Magnum®, Bicep II Lite Magnum®, Callisto® Xtra, Lexar® EZ, Lumax® EZ are Restricted Use

7 Pesticides. Results may vary by geography. All photos are the property of Syngenta unless otherwise noted. Trademarks are the property of a Syngenta Group Company or of their respective owners.

# Acuron<sup>®</sup> Manufacturing Process



Throughout the manufacturing process various inert components are incorporated, processing times fluctuate, and manufacturing methods vary. These steps are all very precise and are required for formulation consistency and integrity.

PROVEN CALLISTO® TECHNOLOGY



NON-OPTIMIZED FORMULATION

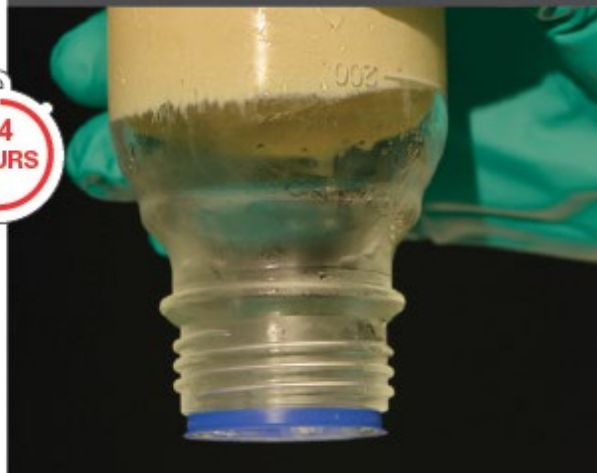


15 MIN

PROVEN CALLISTO TECHNOLOGY



NON-OPTIMIZED FORMULATION



24 HOURS

## The current situation

- Generic manufacturers are trying to convince farmers that their mesotrione-containing products can match the industry-leading performance of Syngenta Callisto-based herbicides, **but there is nothing “just like Callisto” except Callisto.**
- And it’s not just what’s in the tank. When a customer buys proven Syngenta brands, there are a host of other benefits – R&D, technical resources, supply capabilities, product support and customer commitment – behind them.
- Let’s take a deeper look at why **brand matters.**

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status.** Callisto® and the Syngenta logo are trademarks of a Syngenta Group Company.

syngenta®

# The testing



Source: 2017 Syngenta trial; Greensboro, NC.

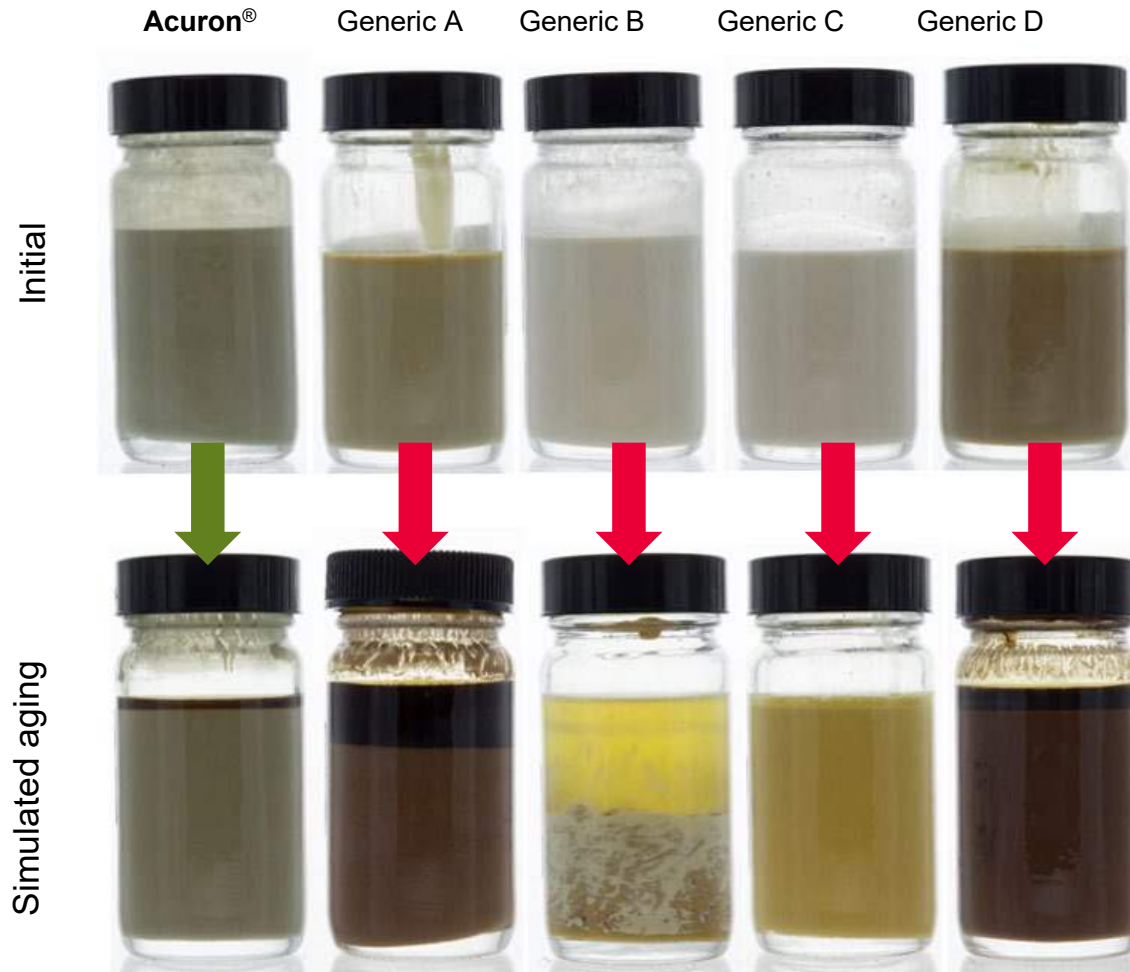
We collected samples of several generic mesotrione herbicide mixtures that are currently being sold and compared them to proven Callisto-based herbicide brands from Syngenta.

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Callisto® and the Syngenta logo are trademarks of a Syngenta Group Company.

**syngenta**®

# Generic mesotrione risk: Mesotrione degradation



The vials on the top row were fresh samples poured on May 24, 2017.

The vials on the bottom row show what the same samples looked like after an accelerated aging test designed to simulate one year of storage stability.

What does it mean?

- Generic formulations may seem stable initially, but the real test happens over time. The bottom vials show the results of a simulated year in storage. Color change is evident with each generic formulation.

Impact:

- Color change can indicate settling, separation and mesotrione degradation.

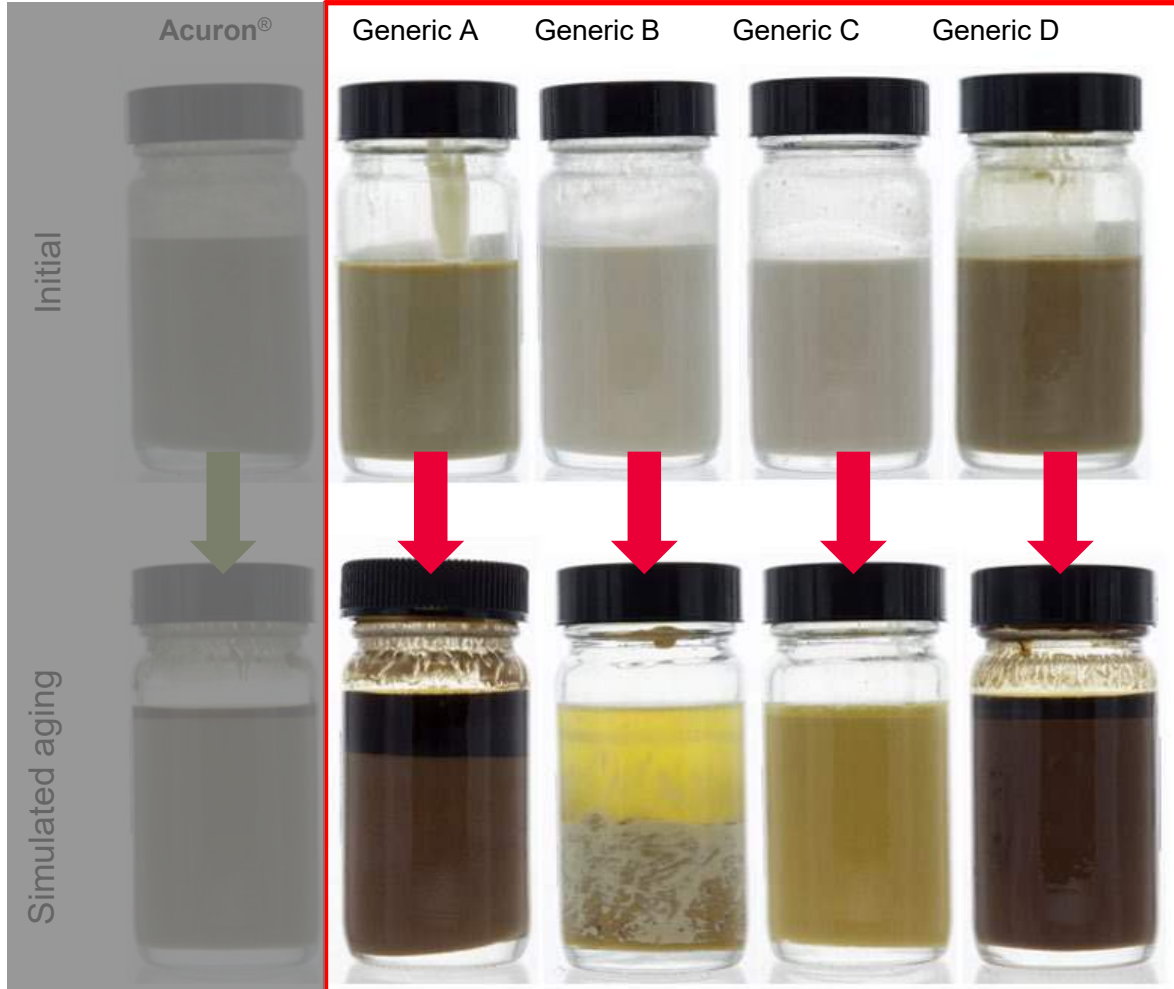
Source: 2017 Syngenta trial; Greensboro, NC.

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Acuron is a Restricted Use Pesticide. Acuron® and the Syngenta logo are trademarks of a Syngenta Group Company.

syngenta®

# Generic mesotrione risk: Mesotrione degradation



Source: 2017 Syngenta trial; Greensboro, NC.

## Impact:

- If you are using **these** generic mesotrione formulations, the active ingredient is degrading over time.
- If you have leftover product that you store over the winter, you may end up spraying less active ingredient next spring than you paid for and may get less control than you expect and more residue to clean up than you ever imagined.

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Acuron is a Restricted Use Pesticide. Acuron® and the Syngenta logo are trademarks of a Syngenta Group Company.

**syngenta**®

Proven Callisto Technology

Non-optimized formulation



## The testing

### Will generic mesotrione formulations

- Maintain their mesotrione concentration over time?
- Remain stable in storage?
- Pump, mix and spray without separating, clumping or clogging my sprayer?

In our trials, each generic formulation tested failed in one or more ways.

Source: 2015 Syngenta trial; Münchwilen, Switzerland.

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Callisto Xtra, Lexar, Lexar EZ, Lumax and Lumax EZ are Restricted Use Pesticides. Callisto®, Lexar®, Lumax® and the Syngenta logo are trademarks of a Syngenta Group Company.

syngenta®



## Generic mesotrione risk: Application and handling issues

### Flowability

- What does this mean?
  - After long-term storage, generic mesotrione formulations can become thicker.
- Impact:
  - Thicker formulations can take more time to load.
  - It took 3.5 more minutes for the generic mesotrione formulation to empty from the 8 oz. jar. Just imagine the extra time it would take if you were dealing with 300 gallons.

\*Both samples kept at 32 F overnight and then immediately poured.

Source: 2017 Syngenta trial; Greensboro, NC.

Classification: Public. Not for distribution.

Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Lexar EZ is a Restricted Use Pesticide.** Lexar® and the Syngenta logo are trademarks of a Syngenta Group Company.

**syngenta**®



## Generic mesotrione risk: Application & handling issues

### Residue

- What does this mean?
  - After long-term storage, generic mesotrione formulations, particularly those with “suspo-emulsion” formulations, can form sticky residues.
- Impact:
  - This residue can clog screens and nozzles causing you to have to stop more often to clean equipment.

Residue left on sprayer equipment surfaces.

Source: 2014 North Star, M

Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status.** The Syngenta logo is a trademark of a Syngenta Group Company.

**syngenta**®

# Generic mesotrione risk: Application and handling issues



Residue after a generic mesotrione formulation was poured through a wet sieve (Left) vs. Lumax EZ (Right).

Source: 2017 Syngenta trial; Greensboro, NC.

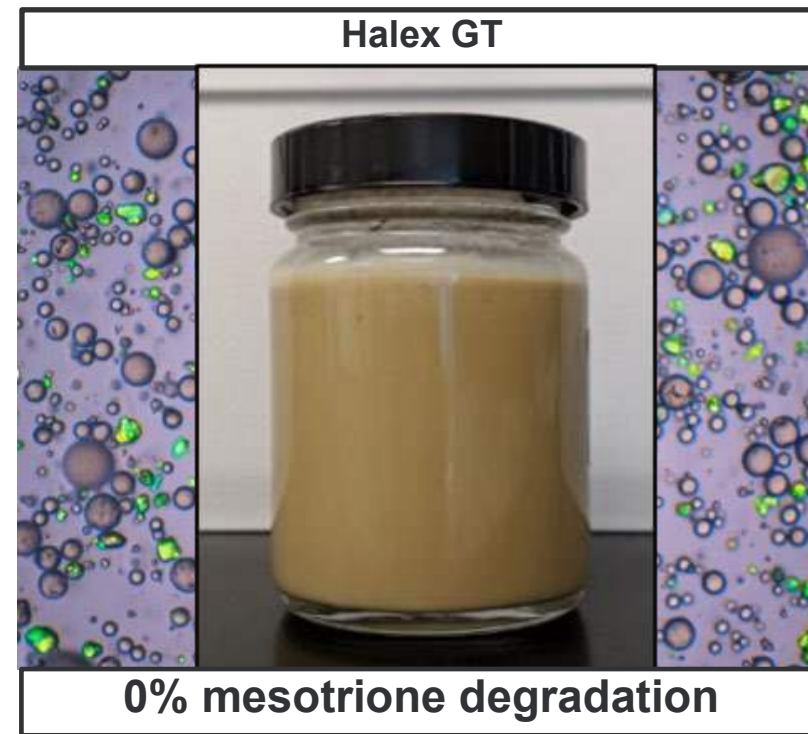
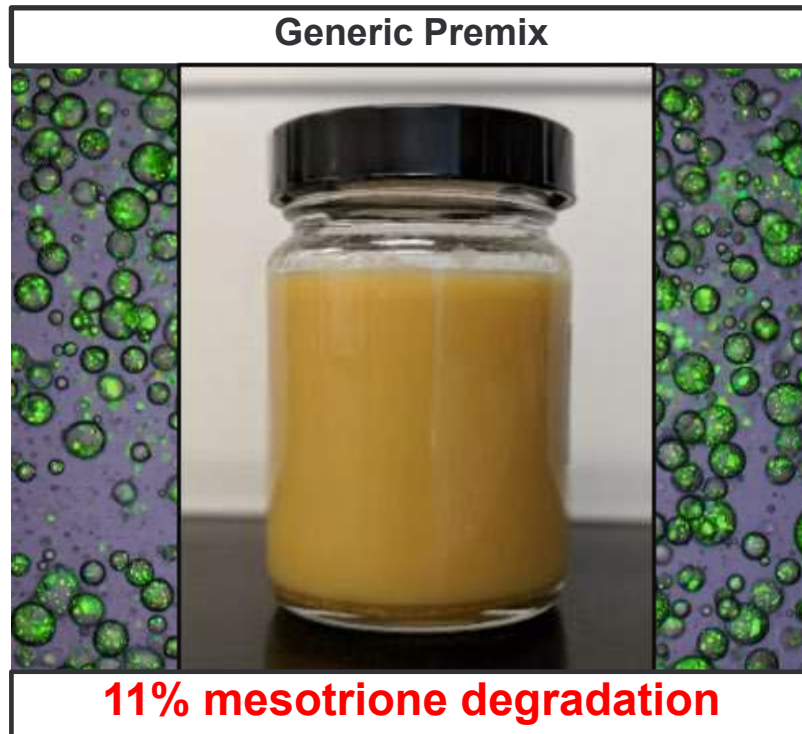
Classification: Public. Not for distribution.  
Photos are either the property of Syngenta or used with permission.

©2020 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. Lumax EZ is a Restricted Use Pesticide.** Lumax® and the Syngenta logo are trademarks of a Syngenta Group Company.

**syngenta**®

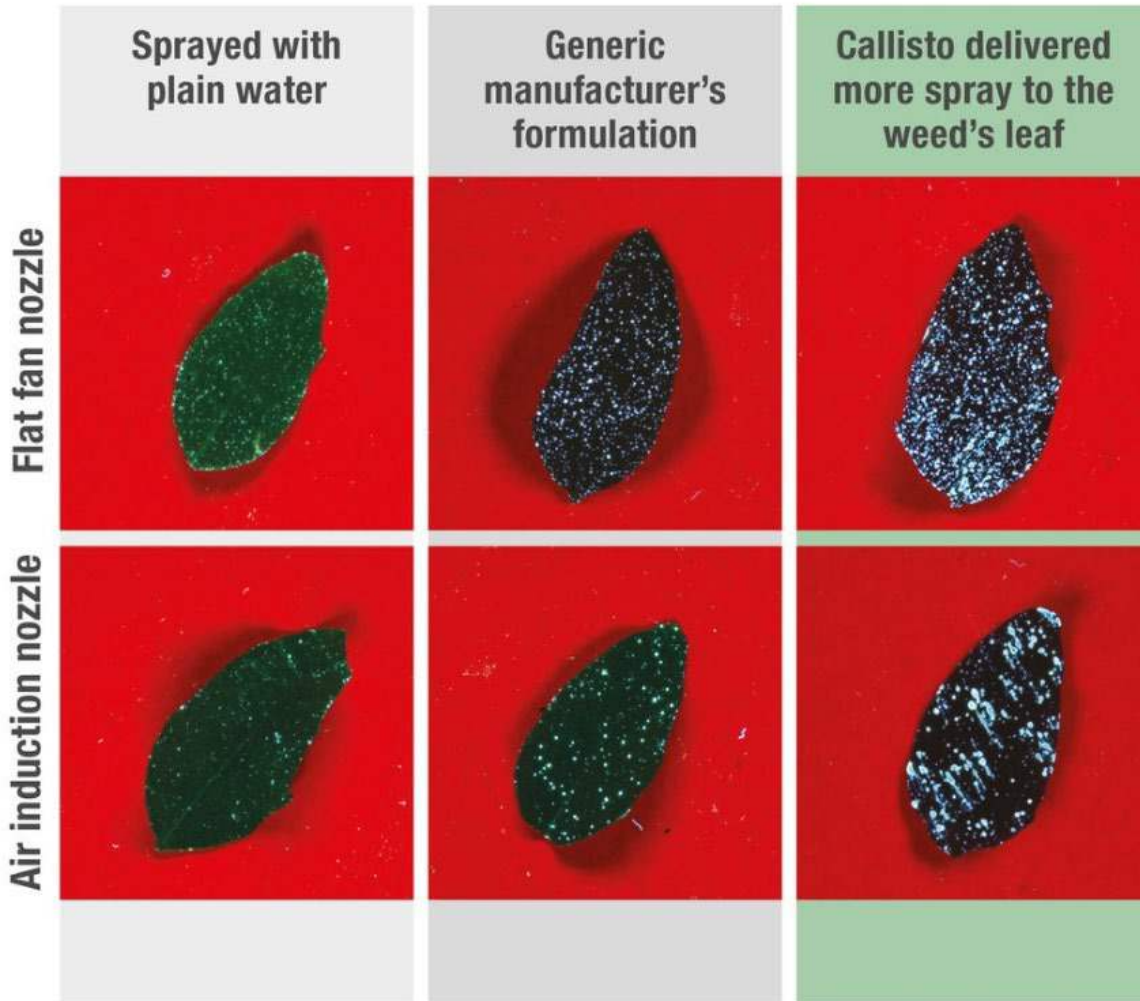
# DoseLock™ Herbicide Innovation

Patent microencapsulation and formulation technology that generic mixtures and generic premixtures do not have.



Generic mixtures inadvertently create a suspoemulsion formulation. Mesotrione coagulates in suspoemulsion formulations.

# DoseLock™ Herbicide Innovation



Can different formulation types (EC vs. CS or SE for example) affect weed control?

- Formulation types do affect weed control.

**Product deposit on lambsquarters leaf visualized with fluorescence**

Source: 2017 Syngenta trial; Greensboro, NC.

# How Does Halex GT With *DoseLock* Formulation Technology Outyield Imitation Tank Mixtures?

Answer: by protecting corn from harmful effects of some formulations



POST: Halex<sup>®</sup> GT + AAtrex<sup>®</sup> 4L



POST: Imitation Tank Mixture

8 DAT

Imitation Tank Mixture: Strelis<sup>®</sup> II 1 pt/A + Atrazine 4L\* 1 qt/A + Bellum<sup>®</sup> 3 fl oz/A + Roundup PowerMAX<sup>®</sup> 3 25 fl oz/A + Liquid AMS 2.5% v/v

Halex GT at 3.6 pt/A + AAtrex<sup>®</sup> 4L at 1 qt/A + NIS 0.25% v/v + Liquid AMS 2.5% v/v

Treatments were mixed and let sit for 3 days. On day 3, treatments were agitated and sprayed at 10 GPA.

Source: Syngenta trial HSM003A4-2023US, Lubbock, TX, 6/8/2023

Classification: PUBLIC - PRESENTATION ONLY - NOT FOR DISTRIBUTION

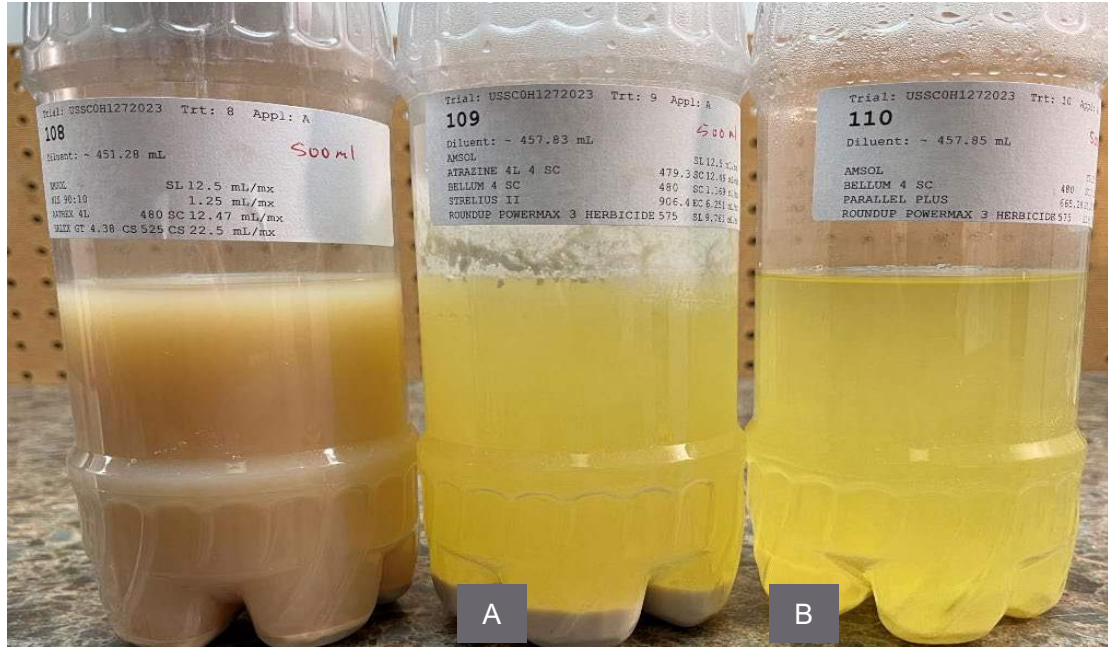
All photos are either the property of Syngenta or are used with permission.

Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trial reflects treatment rates commonly recommended in the marketplace.

© 2023 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. AAtrex 4L is a Restricted Use Pesticide.** AAtrex<sup>®</sup>, DoseLock<sup>™</sup>, Halex<sup>®</sup>, the Alliance Frame and the Syngenta logo are trademarks of a Syngenta Group Company. All other trademarks are the property of their respective third-party owners.

syngenta<sup>®</sup>

# Separation is Highly Visible in Imitation Tank Mixtures



Halex® GT

A & B = Imitation Tank Mixtures

- Separation occurs when herbicides sit, causing the active ingredients to become less evenly distributed in the tank.
- **Separation is highly visible with imitation tank mixtures.** You can see the active ingredients have settled at the bottom of these two imitation tank mixtures (left).
- The sludge at the bottom of the tank is near impossible to recirculate and re-suspend into solution.

Halex GT 3.6 pt/A + AAtrex® 4L 1 qt/A + NIS 0.25% v/v + Liquid AMS 2.5% v/v

Imitation Tank Mixture A: Strelus II 1 pt/A + Atrazine 4L\* 1 qt/A + Bellum® 3 fl oz/A + Roundup PowerMAX® 3 25 fl oz/A + Liquid AMS 2.5% v/v

Imitation Tank Mixture B: Parallel® Plus 1.5 qt/A + Bellum 3 fl oz/A + Roundup PowerMAX 3 25 fl oz/A + Liquid AMS 2.5% v/v

Treatments were mixed and let sit for 3 days. On day 3, treatments were agitated and sprayed at 10 GPA

\* Atrazine 4L is not produced by Syngenta

Location: Lubbock, TX.

Data/Picture Source: Syngenta trial HSM003A4-2023US

Classification: PUBLIC - PRESENTATION ONLY - NOT FOR DISTRIBUTION

All photos are either the property of Syngenta or are used with permission.

Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trial reflects treatment rates commonly recommended in the marketplace.

© 2023 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. AAtrex 4L is a Restricted Use Pesticide.** AAtrex®, Halex®, the Alliance Frame and the Syngenta logo are trademarks of a Syngenta Group Company. All other trademarks are the property of their respective third-party owners.

syngenta®

# Potential for Crop Damage and Reduced Weed Control



Halex® GT

Imitation Tank Mixtures

- If the product is not recirculated well and you get product from the bottom of the tank where the active ingredient is concentrated, a higher-than-intended concentration of active ingredient could be applied, increasing the potential for damage to crops.
- If the product is not recirculated well and comes from the top of the tank, there may be less active ingredient than intended, which will greatly reduce weed control.

Halex GT 3.6 pt/A + AAtrex® 4L 1 qt/A + NIS 0.25% v/v + Liquid AMS 2.5% v/v

Imitation Tank Mixture A: Strelus® II 1 pt/A + Atrazine 4L\* 1 qt/A + Bellum® 3 fl oz/A + Roundup PowerMAX® 3 25 fl oz/A + Liquid AMS 2.5% v/v

Imitation Tank Mixture B: Parallel® Plus 1.5 qt/A + Bellum 3 fl oz/A + Roundup PowerMAX 3 25 fl oz/A + Liquid AMS 2.5% v/v

Treatments were mixed and let sit for 3 days. On day 3, treatments were agitated and sprayed at 10 GPA

\* Atrazine 4L is not produced by Syngenta

Location: Lubbock, TX.

Data/Picture Source: Syngenta trial HSM003A4-2023US

Classification: PUBLIC - PRESENTATION ONLY - NOT FOR DISTRIBUTION

All photos are either the property of Syngenta or are used with permission.

Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trial reflects treatment rates commonly recommended in the marketplace.

© 2023 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. AAtrex 4L is a Restricted Use Pesticide.** AAtrex®, Halex®, the Alliance Frame and the Syngenta logo are trademarks of a Syngenta Group Company. All other trademarks are the property of their respective third-party owners.

syngenta®

# How Does Halex GT With *DoseLock* Formulation Technology Outyield Imitation Tank Mixtures?

Answer: by delivering the full active ingredient load evenly to the weeds

Post-Emergence Weed Control 57 DAT (mixed 3 days prior to spraying)

Palmer amaranth



POST: Halex<sup>®</sup> GT + AAtrex<sup>®</sup> 4L

Barnyardgrass



Palmer amaranth



POST: Imitation Tank Mix

Barnyardgrass



Imitation Tank Mixture: Parallel<sup>®</sup> Plus 1.5 qt/A + Bellum<sup>®</sup> 3 fl oz/A + Roundup PowerMAX<sup>®</sup> x3 25 fl oz/A + Liquid AMS 2.5% v/v  
Halex GT at 3.6 pt/A + AAtrex 4L at 1 qt/A + NIS 0.25% v/v + Liquid AMS 2.5% v/v  
Sprayed at 10 GPA.  
Source: Syngenta trial HSM003A4-2023US, Lubbock, TX 6/8/2022

Classification: PUBLIC - PRESENTATION ONLY - NOT FOR DISTRIBUTION

All photos are either the property of Syngenta or are used with permission.  
Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trial reflects treatment rates commonly recommended in the marketplace.  
© 2023 Syngenta. Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. AAtrex 4L is a Restricted Use Pesticide. AAtrex<sup>®</sup>, DoseLock<sup>™</sup>, Halex<sup>®</sup>, the Alliance Frame and the Syngenta logo are trademarks of a Syngenta Group Company. All other trademarks are the property of their respective third-party owners.

syngenta<sup>®</sup>

# How Does Halex GT With *DoseLock* Formulation Technology Outyield Imitation Tank Mixtures?

Answer: by delivering the full active ingredient load evenly to the weeds

Post-Emergence Weed Control 57 DAT (mixed and sprayed the same day)



POST: Halex<sup>®</sup> GT + AAtrex<sup>®</sup> 4L



POST: Imitation Tank Mix



Imitation Tank Mixture: Parallel<sup>®</sup> Plus 1.5 qt/A + Bellum<sup>®</sup> 3 fl oz/A + Roundup PowerMAX<sup>®</sup> x3 25 fl oz/A + Liquid AMS 2.5% v/v  
Halex GT at 3.6 pt/A + AAtrex 4L at 1 qt/A + NIS 0.25% v/v + Liquid AMS 2.5% v/v  
Sprayed at 10 GPA.  
Source: Syngenta trial HSM003A4-2023US, Lubbock, TX 6/8/2022

Classification: PUBLIC - PRESENTATION ONLY - NOT FOR DISTRIBUTION

All photos are either the property of Syngenta or are used with permission.  
Performance assessments are based upon results or analysis of public information, field observations and/or internal Syngenta evaluations. Trial reflects treatment rates commonly recommended in the marketplace.  
© 2023 Syngenta. **Important: Always read and follow label instructions. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status. AAtrex 4L is a Restricted Use Pesticide.** AAtrex<sup>®</sup>, DoseLock<sup>™</sup>, Halex<sup>®</sup>, the Alliance Frame and the Syngenta logo are trademarks of a Syngenta Group Company. All other trademarks are the property of their respective third-party owners.

# DoseLock™ Herbicide Innovation

Acuron GT: Crop Safety Compared to Other Post-Emergence-Plus-Residual Herbicides

**Corn Injury: 9 DAT (Field Trial)**

 **Acuron® GT**



**Acuron® GT 3.75 pt/A +  
AAtrex® 4L 1 pt/A + NIS +  
AMS (POST); 9 DAT**



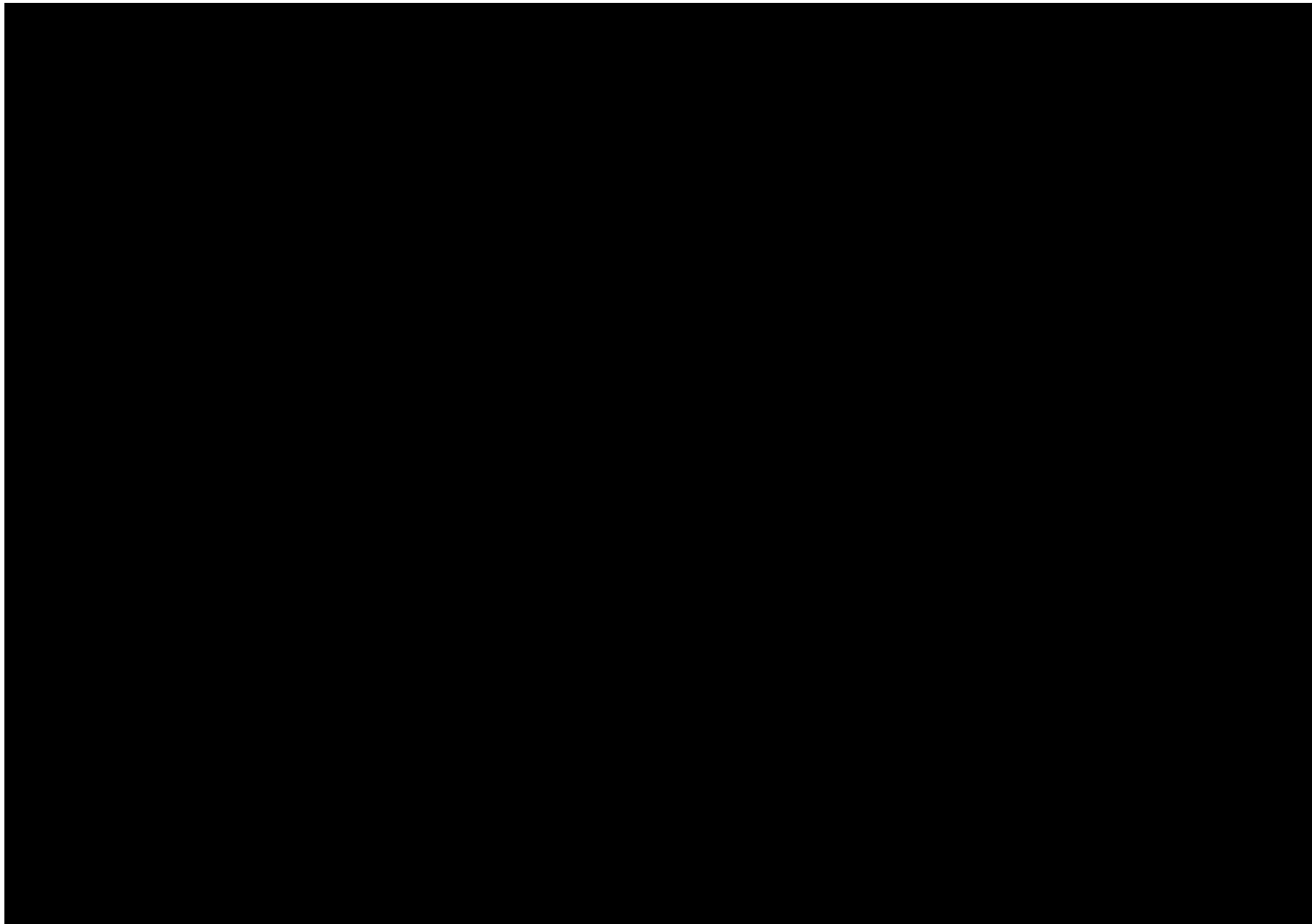
**Resicore® 1.5 qt/A + AAtrex  
4L 1 pt/A + Glyphosate +  
NIS + AMS (POST); 9 DAT**



**Harness® MAX 38 fl oz/A +  
AAtrex 4L 1 pt/A + Glyphosate +  
NIS + AMS (POST); 9 DAT**

Source: Syngenta GME Trials: Yarmouth, IA, 2020 ZLT 06/11/2020. NIS rate 0.25%v/v & AMS 8.5 lb/100 gal

# Retention



Syngenta  
Application Technology Group

# Spray on Soybean Leaf through a Precision Application Nozzle

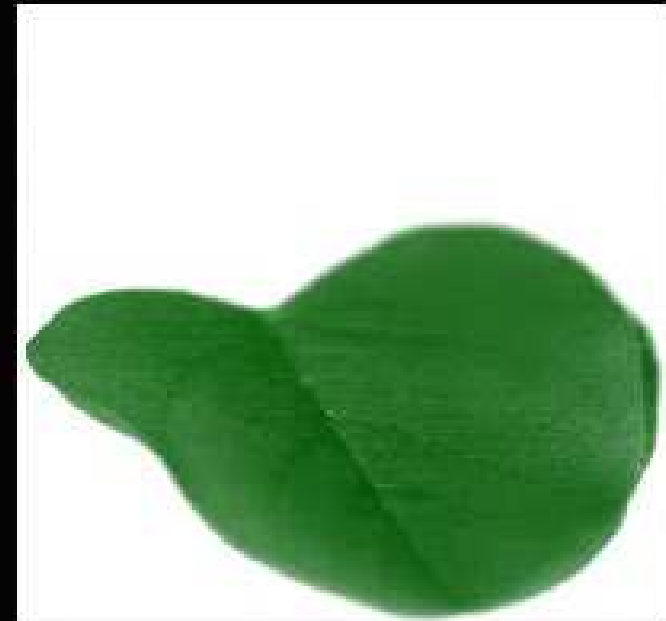
Water



Non-optimized formulation



Optimized formulation

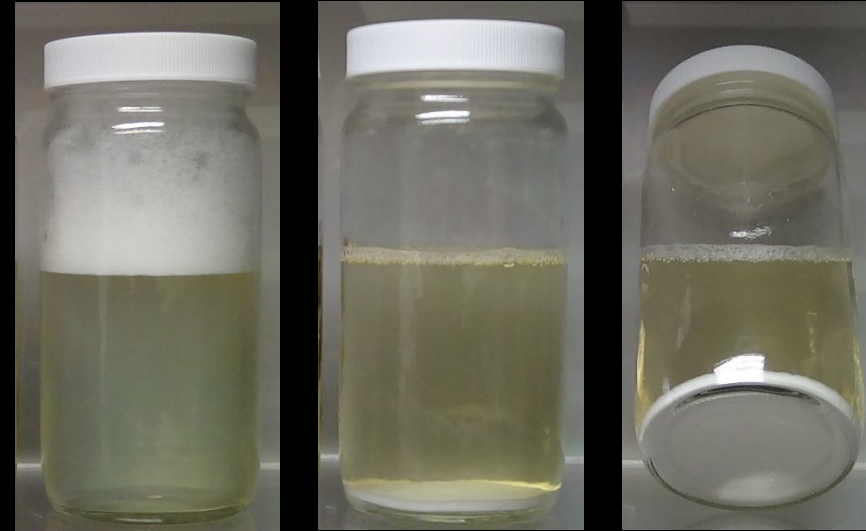


# Competitor Benchmarking: Tank-Mix Compatibility

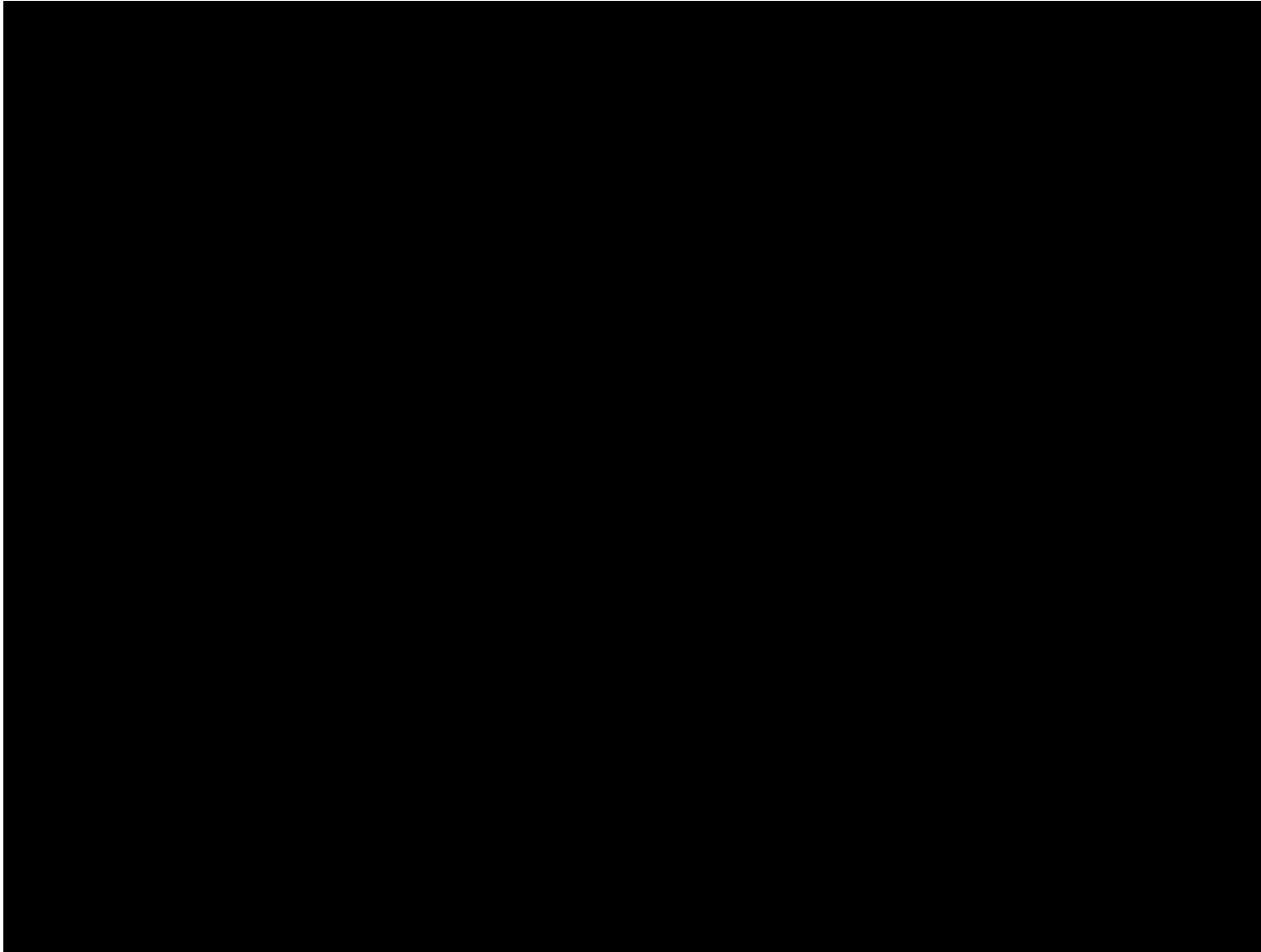
Flexstar GT  
Premix



Generic Fomesafen + Glyphosate  
Tank-mix



# Watchouts



## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**HPPD (#1)  
Group 27**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**HPPD (#2)  
Group 27**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**HPPD (#1) + HPPD (#2)**  
**Group 27**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**VLCFA (#1)  
Group 15**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**VLCFA (#2)  
Group 15**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**VLCFA (#1) + VLCFA (#2)**

**Group 15**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**VLCFA (#2) + HPPD (#1)  
Group 15 and 27**

## Bareground



**23 DAA**



**31 DAA**



**38 DAA**



**52 DAA**

**Premix Formulation  
Group 15 (2) and 27 (2)**

# Legal

Product performance assumes disease presence.

© 2026 Syngenta. **Important: Always read and follow label instructions and overtreatment stewardship practices. Some products may not be registered for sale or use in all states or counties. Please check with your local extension service to ensure registration status.** AAtrex 4L, AAtrex 4LC, AAtrex Nine-O, Acuron, Agri-Flex, Agri-Mek 0.15 EC, Agri-Mek SC, Avicta 500 FS, Avicta Complete Beans 500, Avicta Complete Corn 250, Avicta Duo, Avicta Duo 250 Corn, Avicta Duo Corn, Avicta Duo COT202, Avicta Duo Cotton, Besiege, Bicep II Magnum, Bicep II Magnum FC, Bicep Lite II Magnum, Callisto Xtra, Denim, Endigo ZC, Endigo ZCX, Epi-Mek 0.15EC, Expert, Force, Force 3G, Force 6.5G, Force CS, Force Evo, Gramoxone SL 2.0, Gramoxone SL 3.0, Karate, Karate with Zeon Technology, Lamcap, Lamcap II, Lamdec, Lexar EZ, Lumax EZ, Medal II ATZ, Minecto Pro, Opello, Proclaim, Voliam Xpress and Warrior II with Zeon Technology are Restricted Use Pesticides.

Some seed treatment offers are separately registered products applied to the seed as a combined slurry. **Always read individual product labels and treater instructions before combining and applying component products.**

Trademarks are the property of their respective owners.