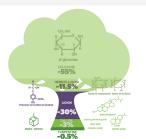
Ingevity: sustainable co-formulants for biologicals



Ingevity manufactures green, biodegradable co-formulant for crop protection applications. Our soft chemistries are very safe for the environment and various microorganisms. Our mission is to protect, enhance and purify the world around us by engaging sustainability in product performance.



- Products are based on pine chemistries
- All pines are sustainably sourced and generated
- All co-formulants contain extremely high biobased green content, mostly >90% biogenic carbon
- All products are inherently or readily biodegradable
- None of the products are microplastics
- All products are TSCA, and REACH compliant, and listed on EPACFR 180.910 or 920
- Polyfon® H completely offsets the volume of GHG released during manufacture and generates carbon footprint 122% lower than fossil carbon-based alternative

	sc	WDG	WP	OD	EC	Biologicals
Dispersants Excellent performance with multi active and high loading premixes	•	•	•			•
Ultra Pure Dispersants - Safe for microbials and biochemicals - Excellent for high density active ingredients - Complete coverage of biological provides excellent stability - 100% UV protection		٠	٠			•
Adjuvants Best natural adjuvant for rainfastness Great compatibility	•			•	•	•
Solvents - High solvency - Biodegradable with low VOCs				٠	٠	
Stabilizing Oil Excellent stability for OD formulations						•







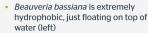


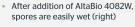
AltaBio™: a premium, green, biodegradable dispersant product line based on kraft lignosulfonates, specifically designed for biologicals and difficult to formulation chemicals

- Bacillus thuringiensis
- Bacillus amyloliquefacien Bacillus subtilis
- Bacillus megaterium Trichoderma reesei
- Beauveria bassiana
- Metharizium spp
- Burkholderia cepacian
- Rhizobium leguminosarum

AltaBio has no growth inhibition with Bt.









Granules disintegrate nicely without inversion or agitation (right)



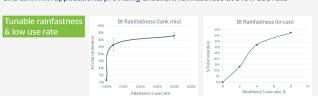
After standing at room temperature for 30 min, still very stable suspension without separation or precipitation:

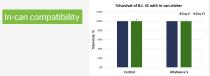
- 10% dilution of extruded Beauveria bassiana (left)
- 1% dilution of extruded Beauveria bassiana (right)

Functions		Formulation #1	Formulation #2	Formulation #3	
	Components	Wt%	Wt%	Wt%	
Active	Beauveria spores*	5	5	5	
Dispersant	AltaBio 200	1			
	Sulfite LS		4		
	Styrene acrylic polymer			4	
Wetting agent	GeoWet HR	5	5	5	
Disintegrator	Sodium monophosphate	3.2	3.2	3.2	
Disintegrator	Sodium diphosphate	4.8	4.8	4.8	
Carrier/Filler	Talc/Hydrite VS (1/4)	Make up to 100	Make up to 100	Make up to 100	

Alta Bio dispersants are extremely efficient, sometimes only requires $\mbox{\ensuremath{\upsigma}}$ of common dispersant use rate in extremely challenging biological formulation, example seen in above recipe table

AltaHance™: a biodegradable green adjuvant product line good for both in-can and tank mix applications, providing excellent rainfastness at a low use rate





 AltaHance is extremely efficient at low use rate for both in-can and tank

AltaHance is very safe to various microorganisms. Fxample: 100% survival rate for Bt after 37 days storage

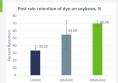








Palmer amaranth leaves cross section showing better CFDA penetration with AltaHance (right)





- AltaHance provides higher rainfastness of dye on soybean comparing to polyterpene (left)
- AltaHance provides better weed control comparing benchmark adjuvant product (Right)

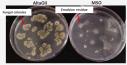
AltaOil™: a line of green oil products, suited for both conventional and biological OD (oil dispersion) formulations with excellent emulsification and shelf stability

Excellent safety

AltaOil is safe with:

- Bacillus spp.
- Trichoderma reesei
- Beauveria bassiana

- Rhizobium leguminosarum



- Metharizium spp.
- Burkholderia cepacian

Excellent safety

Component	Function	A (%)	B (%)
Beauveria spores*	Active	5	5
AltaOil	Oil, co-emulsifier	80	
Methylated Soybean Oil	Oil		80
Surfactant blend	Emulsifier	15	15

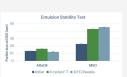
AltaOil provides excellent formulation stability without phase separation and settlement, comparing to MSO

AltaOil OD has flowable viscosity and easy to handle













AltaSolv™: a line of green solvent products with high solvency and low VOCs

High solvency

Solubility @ RT, wt%	AltaSolv	Methylated soybean oil	Aromatic solvent	Butyl lactate	Mixed alkyl amide
Bifenthrin	14-40	19	>50	36	43
Tebuconazole	12-38	19	9	26	35
Azoxystrobin	1-9	0	6	10	4
Pendimethalin	16-55	24	>50	26	NA

	AltaSolv™	Methylated soybean oil	Aromatic solvent	Butyl lactate	Mixed alkyl amide
Green content	High	High	None	Medium	None
Solvency	Medium	Low	High	High	High
Water solubility	Very low	Very low	Very low	Slight	Slight
Tebuconazole solubility	High	Low	Low	High	High
Weight loss% @ 105C	Low to medium	Low	High	High	medium
Hard water stability	Excellent	Ok	Ok	Ok	Excellent
Rainfastness	Tunable	Low	Low	High	Low
Surfactant & solvent compatibility	Good	Good	Good	Good	Good

For additional information and sample inquiries, please contact:





