CLARIANT

Dispersogen™ PSL 100

ONE DISPERSANT – SOLVING MULTIPLE FORMULATION CHALLENGES

Greater chemistry

Optimized formulation stability for an enhanced performance

EVOLVING FORMULATION NEEDS IN MODERN AGRICULTURE
With growing population but limited resources, agriculture seeks sustainability while maximizing yields despite worsening climate conditions. This transformation creates new formulation challenges for crop protection products due to e.g. challenging new active ingredients, complex multi-component formulations with diverse properties, and the need for maximum loading in limited formulation space.

DISPERSANTS AS KEY ENABLER FOR MODERN PESTICIDE FORMULATIONS
Most agrochemical formulations, such as Suspension Concentrates (SC) - now the market-leading formulation type - as well as Flowable Concentrates for Seed Treatment (FS) and Dispersible Concentrates (DC), require stabilization of dispersed active ingredient particles in a continuous liquid phase. This necessitates powerful dispersing agents to achieve optimal bioefficacy, application properties, and stability.

Superior dispersing power, versatility, and efficacy

Dispersogen™ PSL 100 is a versatile polymeric dispersing agent effective at low use rates, either standalone or as a co-dispersant. It provides excellent crystal growth inhibition and tolerates electrolytes and hard water. With 100% active content, it is ideal for formulations with limited space and its water-free composition suits DC and OD formulation requirements. Safe for microorganisms and seed germination, Dispersogen™ PSL 100 is perfect for modern biological and seed treatment applications.

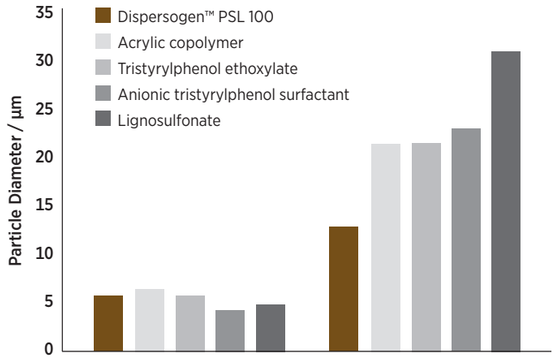
DISPERSOGEN™ PSL 100 – PRODUCT PROFILE

Product description	Nonionic comb-shaped polyacrylate copolymer
Appearance	Viscous, colorless liquid
Active content	100 %
Viscosity	ca. 8,000 mPa*s (23 °C)
pH	ca. 7 (1 % in water)
Application	SC, SE, FS, DC, OD

Dispersogen™ PSL 100 inhibits crystal growth

CRYSTAL GROWTH CONTROL IN SC FORMULATIONS
Crystal growth of partially water-soluble active ingredients is a prevalent formulation challenge since enlarged crystals can lead to formulation instability, clogged spray nozzles, and reduced bioavailability.

Compared to a variety of established dispersant technologies, Dispersogen™ PSL 100 more efficiently inhibits crystal growth of challenging active ingredients with partial water solubility.

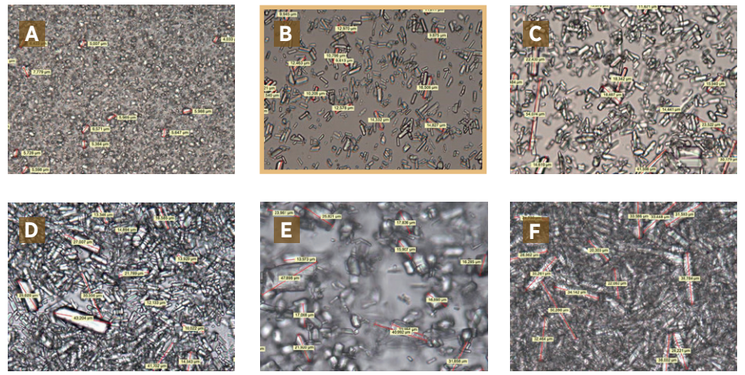


Metribuzin[1] 450 g/L SC formulation as a model system for studying crystal growth inhibition properties

450 g/L	Metribuzin
2 %[2]	**Dispersant**
2 %	Genapol™ X 080
5 %	Propylene glycol
0.4 %	Defoamer
2 %	Xanthan gum (2 %)
Rest	Water

Particle diameters determined by optical microscopy on fresh vs. matured samples of Metribuzin 450 g/L formulations based on Dispersogen™ PSL 100 and various reference dispersants.

1 Solubility of Metribuzin in water (20 °C): 1.05 g/L
2 Active content in final formulation.

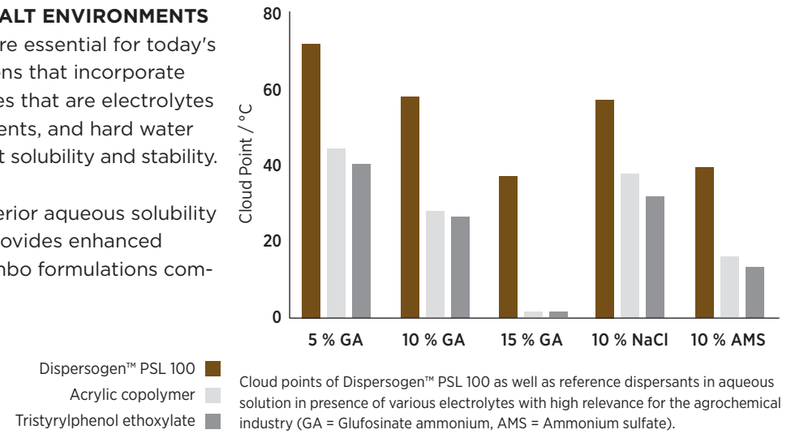


Microscopy images of a fresh Metribuzin 450 g/L SC formulation **(A)** and matured samples stored for 2 weeks at 54 °C based on Dispersogen™ PSL 100 **(B)**, an acrylic copolymer dispersant **(C)**, a tristyrylphenol ethoxylate **(D)**, an anionic tristyrylphenol surfactant **(E)**, and a lignosulfonate **(F)**, each containing 2 % active content of the respective dispersant in the final formulation.

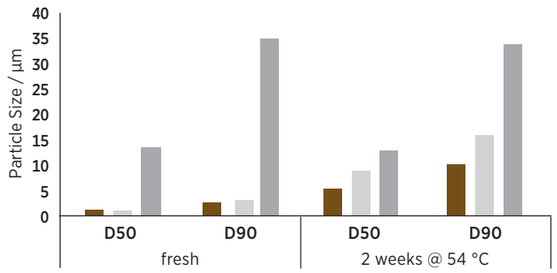
Stable SC formulations in high electrolyte environments

MAINTAIN STABILITY IN HIGH-SALT ENVIRONMENTS
Electrolyte-tolerant dispersants are essential for today's complex agrochemical formulations that incorporate electrolytes – such as other actives that are electrolytes themselves, fertilizers, micronutrients, and hard water ions – which can reduce dispersant solubility and stability.

Dispersogen™ PSL 100 offers superior aqueous solubility in high salt concentrations and provides enhanced particle stabilization in SC/SL combo formulations compared to benchmark dispersants.



Cloud points of Dispersogen™ PSL 100 as well as reference dispersants in aqueous solution in presence of various electrolytes with high relevance for the agrochemical industry (GA = Glufosinate ammonium, AMS = Ammonium sulfate).



Particle size distributions determined by laser diffraction on fresh vs. matured samples of Saflufenacil 60 g/L SC + Glufosinate ammonium 80 g/L SL combo formulations based on Dispersogen™ PSL 100 as well as established electrolyte tolerant dispersants (each containing 1 % active content of the respective dispersant in the final formulation).

Saflufenacil 60 g/L SC + Glufosinate ammonium 80 g/L SL combo formulation as a model system for studying electrolyte tolerance

60 g/L	Saflufenacil
80 g/L	Glufosinate ammonium
1 %[1]	**Dispersant**
1 %	Genapol™ X 080
2.5 %	Propylene glycol
0.25 %	Defoamer
9 %	Xanthan gum (2 %)
Rest	Water

1 Active content in final formulation.

Dispersogen™ PSL 100
Acrylic copolymer
Amphoteric copolymer

A dispersant for actives with low melting points

SUPERIOR STABILITY FOR LOW MELTING POINT ACTIVES
Creating stable dispersions of active ingredients with low melting points is a challenge. Particles can soften or melt under production, storage, or application conditions, leading to agglomeration, caking, or gelling. Dispersogen™ PSL 100 ensures a strong particle stabilization of active ingredients with a challengingly low melting point and provides SC formulations with a superior quality consistency and process stability.

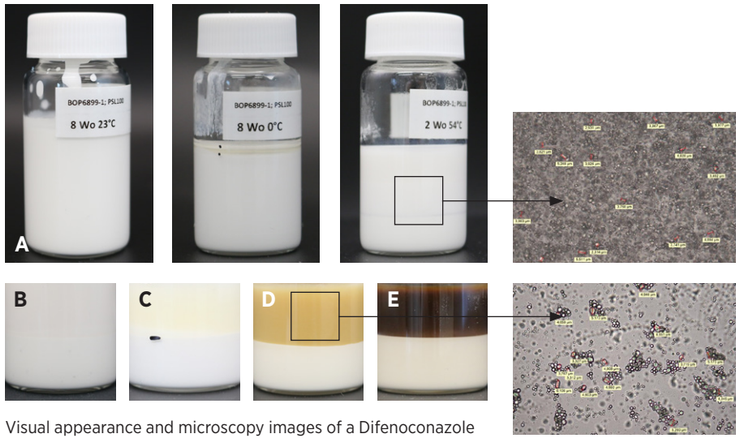
Difenoconazole[1] 400 g/L SC guide formulation

400 g/L	Difenoconazole
2 %	Dispersogen™ PSL 100
3 %	Genapol™ 10500
5 %	Propylene glycol
0.4 %	Defoamer
3 %	Xanthan gum (2 %)
Rest	Water

Formulation properties

Appearance	White liquid suspension
pH (1% in water)	ca. 6.5
Density (20 °C)	1.13 g/cm³
Particle size (d90)	<5 µm
Viscosity (10 s-1, 23 °C)	ca. 230 mPa*s
Suspensibility	>98 %

1 Melting point of Difenoconazole varies from ca. 76 – 83 °C, depending on the grade and purity.



Visual appearance and microscopy images of a Difenoconazole 400 g/L SC formulation based on **(A)** Dispersogen™ PSL 100 (left: after 8 weeks at 23 °C, middle: after 8 weeks at 0 °C, right: after 2 weeks at 54 °C) and based on established reference dispersants upon storage for 2 weeks at 54 °C (**(B)** acrylic copolymer, **(C)** anionic tristyrylphenol surfactant, **(D)** naphthalene sulfonate condensate, and **(E)** lignosulfonate), each formulation containing 2% active content of the respective dispersant and exhibiting a similar viscosity level.

Enhanced seed treatment formulations & microbial biologicals

SEED TREATMENT FORMULATIONS WITH ENHANCED PERFORMANCE

Seed treatment offers an environmentally friendly approach that reduces agrochemical usage and protects non-target organisms. Flowable Concentrates for Seed Treatment (FS) require specialized dispersants for optimal performance. Dispersogen™ PSL 100 delivers excellent dispersing properties in FS formulations without affecting seed germination. It is microplastic-free and shows a beneficial effect on abrasion resistance and flowability properties of treated seeds, making it an ideal option for modern seed treatment applications.

Guide formulation for a Flowable Concentrate for Seed Treatment (FS)

300 g/L	Neonicotinoid insecticide
30 g/L	Triazole fungicide
30 g/L	Phenylpyrrole fungicide
1 %	Dispersogen™ PSL 100
2 %	Dispersogen™ LFS
1.5 %	Genapol™ O 100
2 %	Propylene glycol
2 %	Glycerol
0.6 %	Defoamer
2 %	Xanthan gum (2 %)
5 %	Colorant
Rest	Water

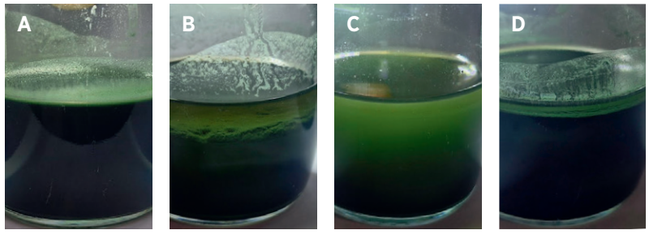
Formulation properties

Appearance	Colored liquid
pH (1 % in water)	ca. 7.5
Density (20 °C)	1.13 g/cm³
Viscosity (100 s^{-1}, 23 °C)	ca. 300 mPa*s

STABILIZING MICROBIAL-BASED BIOLOGICAL FORMULATIONS

Biological formulations with living microorganisms offer a sustainable alternative to chemical pesticides with fewer regulatory concerns. However, they require specialized dispersants for proper suspension and stabilization.

Dispersogen™ PSL 100 is compatible with various microorganisms without affecting cell viability. Its versatility allows use in both water-based SC and oil-based OD microbial formulations, preventing phase separation and settling in both concentrated products and diluted spray mixtures.



Fungi-based Oil Dispersion (OD) formulation (active ingredient: Trichoderma; oil: methylated seed oil; emulsifier: Emulsogen BIT; rheology modifier: fumed silica) before **(A)** and after **(B)** storage at room temperature for 24 hours. Addition of an EO/PO block copolymeric dispersant **(C)** impairs formulation stability, while addition of 3 % Dispersogen™ PSL 100 **(D)** significantly improves stability and reduces settling.

Discover the superior dispersing power, versatility, and efficacy of Dispersogen™ PSL 100

CRYSTAL GROWTH INHIBITION PROPERTIES
Reduces particle growth of challenging active ingredients

HIGH VERSATILITY
Suitability across a variety of formulation types

SUITABLE FOR BIOLOGICAL FORMULATIONS
Excellent biocompatibility with a broad range of microbial formulations

ELECTROLYTE TOLERANCE
Maximum formulation flexibility due to good compatibility with salts

EASY AND SAFE USE
100% active, flowable, non-foaming, colorless product that is free of any hazard labelling

HIGHLY EFFICIENT
Enables highly loaded formulations at exceptionally low use rates

Find out more about Dispersogen™ PSL 100 and get in contact!

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