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Agricultural Silicone Spreading Agent Silfluo LA-14

Polyether-Modified Trisiloxane Agricultural Surfactant

Description:

Silfluo LA-14 is a 100% active nonionic polyether-modified trisiloxane surfactant (CAS 125997-17-3), solvent-free, for use as an agricultural spray adjuvant and in-can formulation additive.

At 0.1 wt% aqueous concentration, LA-14 reduces surface tension to 21.0 ± 1.0 mN/m. At this surface tension level, the contact angle of spray droplets on wax-coated leaf surfaces drops below the threshold for stomatal entry, expanding wetted area per droplet and facilitating capillary penetration through stomatal pores (typical width 3 – 15 μm).

Performance is equivalent to Dow SYLGARD OFX-0309 (formerly XIAMETER OFX-0309).

Typical Technical Properties:

Silfluo Code:	LA-14
Chemical Name: Synonyms:	Polyether-Modified Trisiloxane (Trisiloxane Ethoxylate) Organosilicone Spreading Agent, Low-Foam Silicone Adjuvant
CAS NO.:	125997-17-3
Appearance:	Clear, colorless to pale yellow liquid
Active Content (%):	100(Solvent-free)
Viscosity (25°C, mPa·s):	20 - 40
Surface Tension (0.1% aq., 25°C, mN/m):	21.0 +/- 1.0 mN/m
Cloud Point (1.0 wt% aq.):	< 10 °C

Mechanism of Action

The trisiloxane backbone adopts a "T-shaped" molecular geometry at the air-water interface, enabling surface tension reduction to approximately 21 mN/m at 0.1 wt%. At this surface tension level, the contact angle of spray droplets on wax-coated leaf surfaces drops below the threshold for stomatal entry, expanding the wetted area per droplet relative to hydrocarbon surfactant systems.

Reduced surface tension below 21 mN/m allows aqueous droplets to enter open stomata by capillary penetration, bypassing the cuticular wax barrier and placing water-soluble active ingredients into the sub-stomatal cavity for uptake into plant vascular tissue. Rainfastness is achieved within 15

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– 30 minutes of application under field conditions, as stomatal absorption occurs before rainfall removes the spray deposit from the leaf surface.
Low-foaming profile - relative to standard trisiloxane ethoxylates - reduces air entrainment during tank agitation, maintaining consistent pump pressure and spray pattern uniformity across the application pass.

Applications and Recommended Use Rates

Tank-Mix Adjuvant

LA-14 is active at 0.015 – 0.15 wt% of the spray tank volume. Initiate testing at 0.1% and reduce to the minimum effective concentration for the specific active ingredient, crop, and application method. Concentrations above 0.15% do not proportionally improve spreading and may cause phytotoxicity on sensitive crops; verify on target crop at recommended rates before commercial application.

Agrochemical Class	Recommended Use Rate (wt% of spray volume)
Herbicides	0.025%–0.15%
Insecticides	0.025%–0.1%
Fungicides	0.025%–0.15%
Plant Growth Regulators	0.025%–0.05%
Foliar Fertilizers / Micronutrients	0.015%–0.1%

In-Can Formulation Additive

Use at 0.1 – 5.0 wt% of total formulation weight. Buffer the final formulation to pH 6.5 – 7.5 to prevent trisiloxane hydrolysis during shelf storage. Verify compatibility and phase stability at 40°C / 75% RH for a minimum of 3 months with surface tension measurement at t = 0, 1, 2, and 3 months before commercialization.

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Spray Tank Mixing Sequence

Fill the spray tank with 80% of the calculated water volume.
Add agrochemicals and agitate until fully dissolved or uniformly suspended.
Add the calculated volume of LA-14.
Add remaining 20% water and agitate gently to limit foam generation.

Do not add LA-14 directly to concentrated agrochemical before dilution — premixing at high active ingredient concentration may cause incompatibility or precipitation.

Application Parameters

pH window: maintain spray mixture at pH 6.0 – 8.0. Apply within 24 hours of preparation; hydrolysis of the trisiloxane Si – O – Si bonds occurs at pH ⩽ 5.0 or ⩾ 9.0, generating heptamethyltrisiloxanol and the polyether fragment — both surface-inactive — reducing adjuvant efficacy.

Temperature: apply at ambient temperatures between 10°C and 35°C. At temperatures below 10°C, stomata may be closed, reducing the stomatal infiltration pathway regardless of surface tension.
Nozzle selection: flat-fan or hollow-cone nozzles with small aperture (< 0.3 mm tip) are recommended to produce fine droplets (VMD 150 – 250 μm) that improve canopy penetration and droplet coverage density per unit leaf area.
Spray water volume: total spray water volume can typically be reduced by up to 30% compared to standard applications at equivalent active ingredient dose per hectare; verify reduction rates via field trial before commercial adoption.

Package &Storage:

In 20Kg, 200Kg Plastic barrel or 1000kg, or up to clients request.
Keep in cool, dry and ventilated place. Keep away from sunlight and fire sources. Keep in unopened containers, shelf life is 24 months from the date of production. It is shipped as non-hazardous substance.
Storage beyond the shelf life does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

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