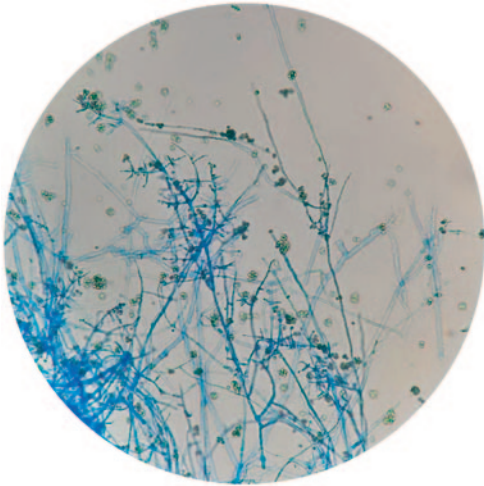




Formulation of microbial products

with CITROFOL® AI

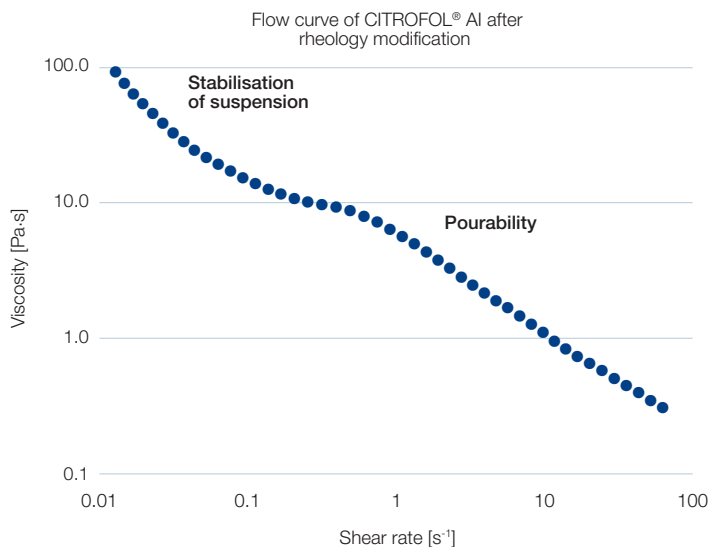
CITROFOL® AI serves as a non-aqueous, liquid carrier for formulating bacterial and fungal biocontrol and biostimulant agents, resulting in excellent shelf-life.

Benefits at a glance

Technical benefits

CITROFOL® AI is partially water-soluble, with a solubility of up to 58 g/L. When added to the spray tank at typical use rates, it fully dissolves without the need for emulsifiers, simplifying the formulation process.

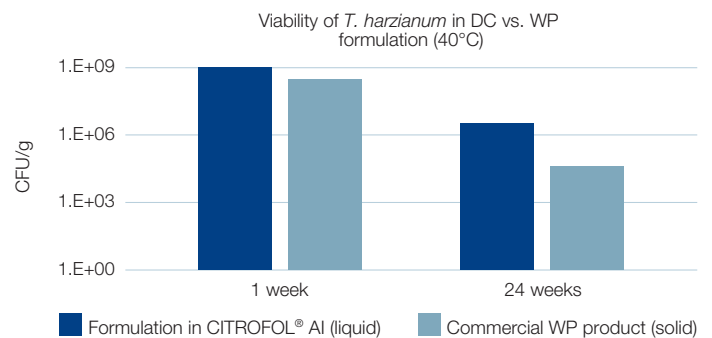
Protocols for modifying the rheology of CITROFOL® AI are available to stabilise the suspension of microorganisms. It exhibits excellent shear thinning behaviour, ensuring both suspension stability on the shelf and easy pourability.



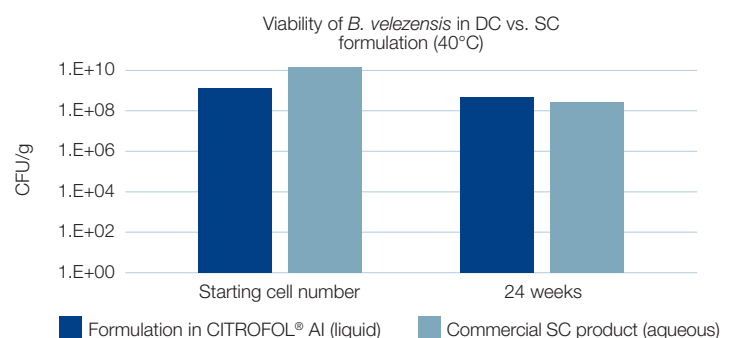
Enhanced shelf-life

Shelf-life tests were conducted using the fungi *Trichoderma harzianum* and the bacteria *Bacillus velezensis* as model microorganisms, subjected to challenging conditions of 40°C for 6 months.

The final cell viability of *T. harzianum* in CITROFOL® AI was two orders of magnitude higher than in the wettable powder product.



The cell viability of *B. velezensis* was more stable when formulated in CITROFOL® AI compared to an aqueous suspension concentrate.



Jungbunzlauer ingredients

Name	CITROFOL® AI (Triethyl Citrate)
Function	Carrier
Biodegradability ¹⁾	Readily biodegradable
CAS number	77-93-0
EC number	201-070-7
REACH number	01-2119955435-32-0000

¹⁾ Method: OECD test guideline 301

Value proposition

Microbial shelf-life

- Improvement of shelf life under harsh storage conditions by a factor of up to 100
- High potential for shelf-life improvement of fungal agents
- Improvement also for *Bacillus* when compared to aqueous suspensions

Technical benefits

- Water-soluble in relevant concentration range, thus no emulsifier needed
- Water-free, thus no preservative needed
- Pourable over wide temperature range
- Protocols to adjust viscosity are available
- Improved wetting

Bio-based, biodegradable and safe

- Non-hazardous according to EU GHS
- 100% bio-based
- Certified biobased according to USDA (United States Department of Agriculture)
- FIFRA-listed (Federal Insecticide, Fungicide, and Rodenticide Act)
- Non-flammable
- Non-volatile organic compound (non-VOC)
- Microplastic free