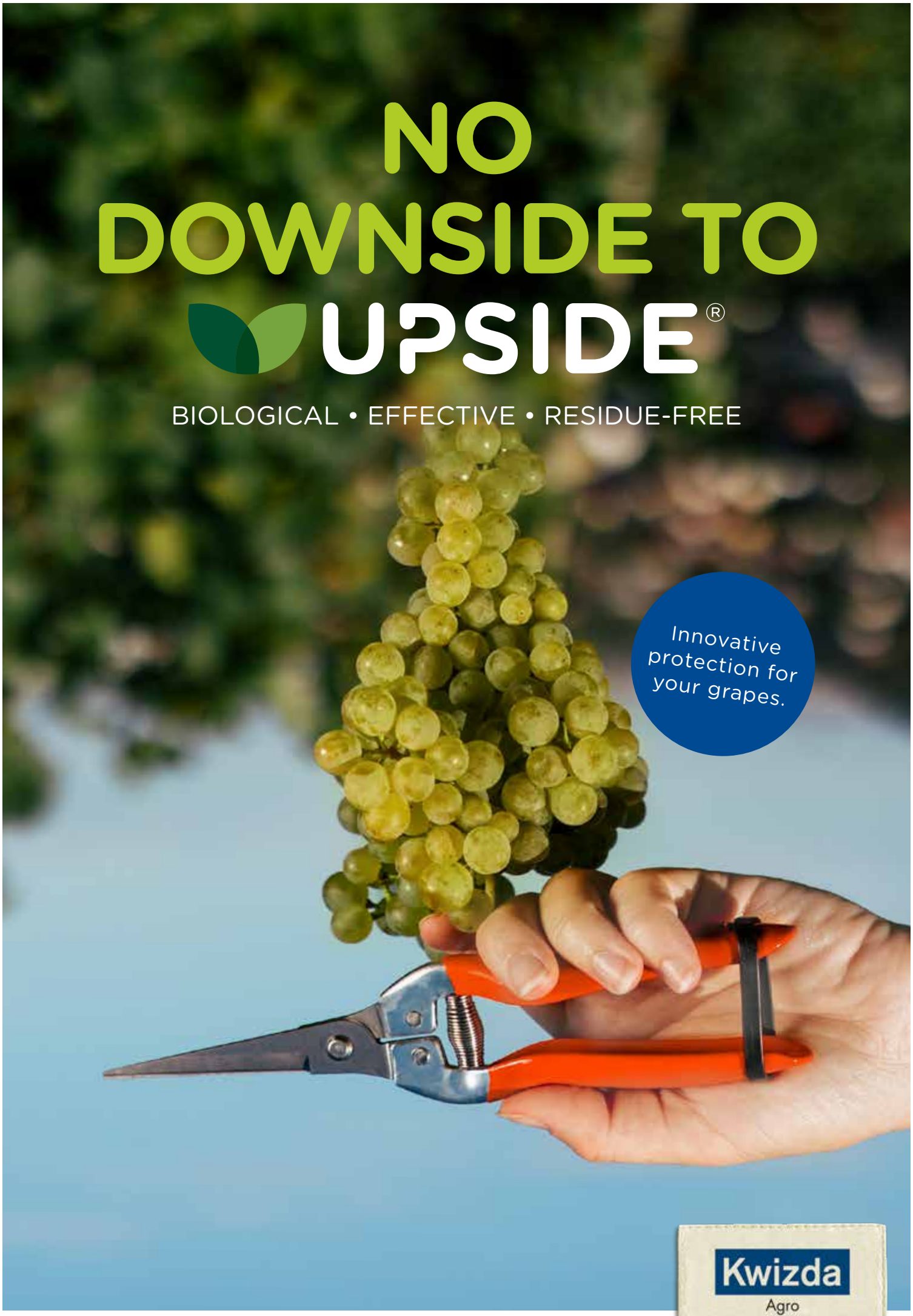

NO
DOWNSIDE TO
UPSIDE®
BIOLOGICAL • EFFECTIVE • RESIDUE-FREE
Innovative protection for your grapes.
Kwizda
Agro

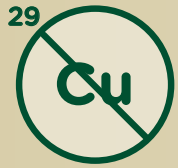
UPSIDE®

The New Fungicide for Organic Viticulture

Political pressure and consumer demand for environmentally sound and sustainable production are the current focal points of discussion in the agriculture industry. However, there are still few alternatives to chemically synthesized plant protection, particularly in disease control. Kwizda Agro is trying to fill this gap: as a specialist in the development, registration and marketing of plant protection products, Kwizda Agro is also increasing its focus on plant protection in organic farming, alongside conventional agriculture.

UPSIDE® is one of the first products arising from this development to reach the market. UPSIDE® is based on the active substance ABE-IT 56, which is extracted from yeast cell fragments (*Saccharomyces cerevisiae*, strain DDSF623).
With its innovative mode of action, UPSIDE® will play a key role in combating downy mildew (*Plasmopara viticola*) in both organic and integrated viticulture.

Your Benefits



Copper-free

UPSIDE® is copper-free and allows the reduction of copper in spraying programs through its use.



Smart dual mode of action for Peronospora control

UPSIDE® has an indirect effect that strengthens the plant's defenses by activating natural defense mechanisms, coupled with a direct effect that prevents the development of the pathogen from the very beginning. Shortly after UPSIDE®'s application, the plant gets ready to fight possible attacks, which makes its reaction far more efficient.



Low-risk active ingredient

The active ingredient ABE IT-56 is classified as a "low-risk" substance and has its natural origin in yeast cells, which are present in tiny fragments in a powerful formulation. These yeast cell fragments of cerevisiae contain a large number of molecules such as glucans, chitin, oligosaccharides and mannans, which are freely available to the plants thanks to the special production process of UPSIDE®. These mimic a pathogen infection and thus stimulate the plant's own defenses at a crucial time to be able to protect itself against later attacks.



Optimized formulation

UPSIDE® is a liquid, ready-to-use, state-of-the-art formulation, granting prompt availability of all components for an optimal response of the plant to the product application. The optimal particle size ensures thorough wetting of the treated surface for enhanced protection.

UPSIDE®

Product Facts

Active substance	ABE-IT 56 (*Saccharomyces cerevisiae,* strain DDSF623)
Mode of action	Activates the plant's own defense mechanisms and directly impairs the pathogen membrane functionality
Culture	Grapes
Indications	Downy mildew (*Plasmopara viticola*)
Application period	BBCH 13 – BBCH 79 (3rd leaves unfolded to majority of berries touching)
Application rate	2.5 l/10,000 m^2 leaf wall area, max. 4 l/ha
Pre-harvest interval	3 days
Formulation	SC (suspension concentrate)
Container size	5 l
Storage life	24 months at room temperature
Unique	• Strengthens the plant's natural immune system • Can reduce copper in the spray sequence • Is residue-free and supports resistance management • Features an alternative, dual-action mechanism



UPSIDE®

Application Recommendations

	13 3-leaf stage	55 Inflores-cences swelling	61 Beginning of flowering	69 End of flowering	71 Fruit set	73 Berries groat-sized	79 Bunch closure completed	81 Beginning of ripening	89 Berries ripe for harvest
BBCH									

Organic cultivation

With low risk of infection

3x UPSIDE®	Copper	3x UPSIDE®	Copper

With high risk of infection

3x UPSIDE® + reduced copper	Copper	3x UPSIDE® + reduced copper	Copper

Integrated cultivation

3x UPSIDE®	Integrated spray sequence

Application	• For best results, apply preventively in blocks of 3 sprays • 3 applications, 7 days apart • Mixing with copper is recommended in the event of a high risk of infection
Application date	• UPSIDE® should be applied several times preventively to prevent possible infection. This gives the vine the time it needs to mobilize its own defenses • Starting application of UPSIDE® at an early stage maximizes its effectiveness
Miscibility	• UPSIDE® mixes well with all commonly used biological plant protection products (copper, sulfur, potassium hydrogen carbonate)



UPSIDE®

New mode of action



New tool for resistance management





Active substance of natural origin



Reduces the use of copper and chemical products

Environmentally Friendly & Residue-free

Safe application



Harmless to bees





Strong formulation

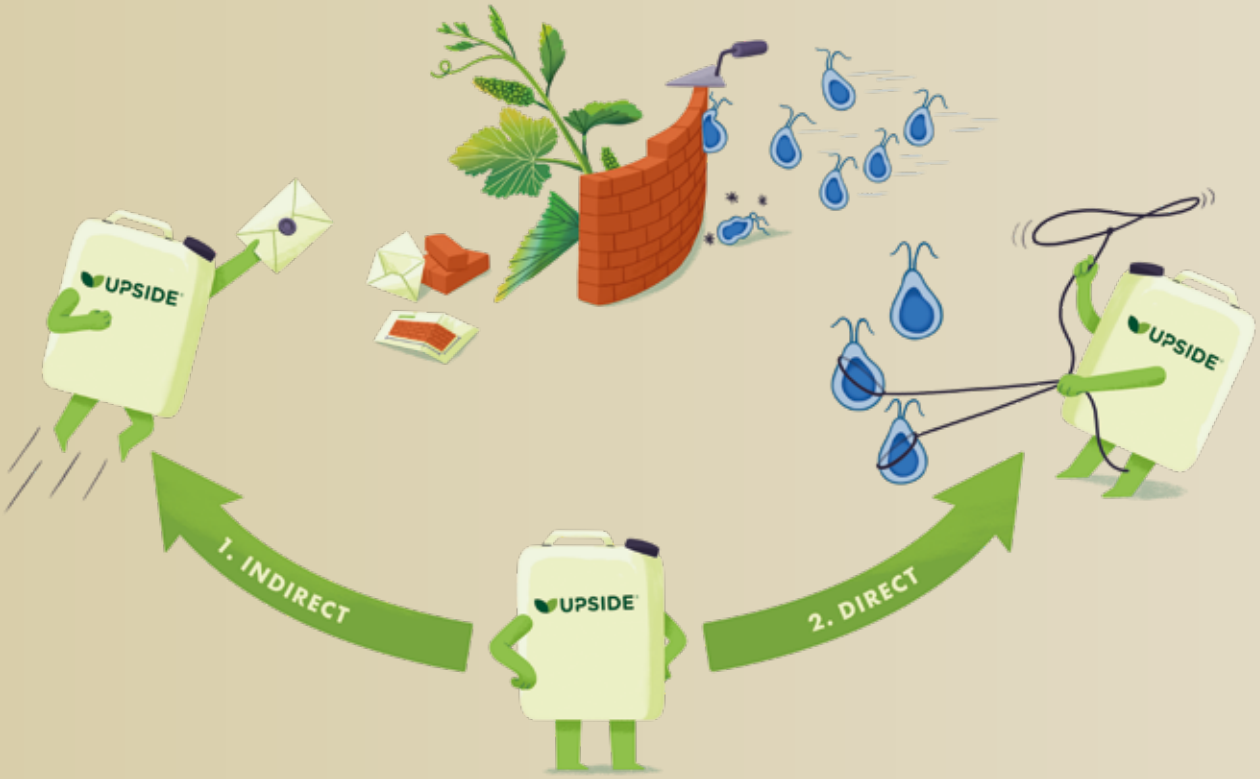


No maximum residue limits

Mode of Action

UPSIDE® has an indirect effect that boosts the plant's defenses by activating natural defense mechanisms, combined with a direct effect that counters the pathogen's development from the outset.

UPSIDE® protects the plant using a dual mode of action.



1. INDIRECT action:

This is the main action mechanism responsible for the vast majority of disease control. UPSIDE® mimics the structures of the pathogen and signals to the plant that an attack from a pathogen is imminent. The plant receives this signal and then prepares to defend itself (by building a fortress). The spores of the pathogen that try to penetrate the plant's defense system are confronted with a solid wall that blocks their path.

2. DIRECT action:

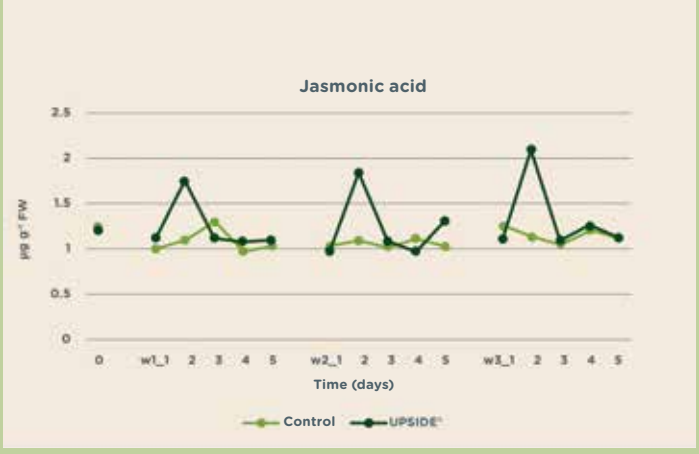
Additional protective measures against the pathogen. UPSIDE® is able to interact directly with the pathogen spores and prevent some of them from joining the attack. This reduces the force of the attack to which the plant is exposed.

Indirect Action

UPSIDE® is unique in its ability to act indirectly against several plant diseases. The plant's natural defenses are induced and boosted at an early stage, even before the pathogen actually appears on the plant. The application of UPSIDE® simulates a pathogen attack, and this immediately produces messenger substances in the plant. The plant is given an early warning and thinks that there is a potential attack from pathogens. Molecules that the plant develops in the event of an early alert are salicylic acid, jasmonic acid and ethylene. These molecules spread throughout the entire plant tissues in such a way that all parts of the plant are warned, and measures to counter the potential infectious pathogen can be put in place.

Signal Molecule Production

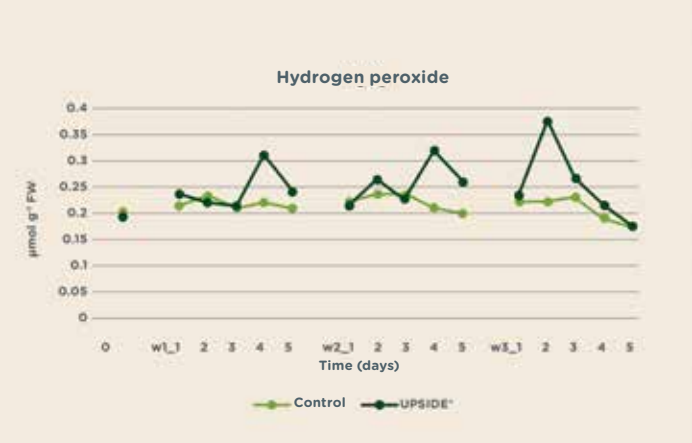
The figure shows that there is a sharp rise in jasmonic acid levels a day after application of UPSIDE®. After the second application of UPSIDE®, the concentration of jasmonic acid increases on the day after application and peaks after the third application with UPSIDE®. This increase in the signal molecule jasmonic acid shows a kind of memory effect in the plant, in that the plant can respond to preceding warning signals with a strengthened counter-response in subsequent applications.



Signal molecule production
(Here: jasmonic acid) Application of UPSIDE® shows a significant increase after each application. This indicates activation of the plant's immune system.

Free Radicals as a Defense

After the plant has been warned of potential pathogens, it starts to produce substances internally as a countermeasure. Free radicals are one class of substance that can disrupt the functioning of the pathogen membranes. These molecules are extremely reactive. They are able to destroy the membranes of pathogens and swiftly impair their functioning, with the result that cell material leaks out and the pathogens subsequently die off. Through the production of free radicals, the infection is stopped straight away. One of the most important molecules in this substance class is hydrogen peroxide, which is depicted in the chart. The production of free radicals progresses in a similar way to the production of jasmonic acid after application with UPSIDE®.



Free radicals as a defense
(In this case: hydrogen peroxide) In addition to activation of the immune system, an "oxidative burst" leads to the production of free radicals, which combat the pathogen instantly.

Direct Action

In addition to its indirect effect, UPSIDE® also has a direct effect that counters the pathogen's development from the outset (even before the plant detects the pathogen).

UPSIDE® contains enzymatically dissolved poly-saccharides. These have a direct effect on pathogens. When polysaccharides dissolved in UPSIDE® come into contact with the cell surface of the pathogen, an electrostatic interaction occurs. The electrostatic interaction of negatively charged cell membranes of fungal pathogens with positively charged UPSIDE® molecules disrupts the function on the cell surface of the pathogen and subsequently leads to cell death due to the leakage of cell material.

High-quality Formulation

Alongside the dual-action mechanism, the high-quality liquid formulation of UPSIDE® makes it extremely effective. The formulation of UPSIDE® produces very small particle sizes to ensure optimum wetting of the plant. The liquid formulation of UPSIDE® with an integrated wetting agent makes it suitable for instant use.



FAQs

Is full wetting of the leaves in the early stages (3–5 leaves) important to the effectiveness of the product?

Full wetting of the treated plant is advisable both in the initial stage and in each development stage in order to accelerate activation of the plant's own defenses. As soon as UPSIDE® has been applied to the plant, a systemic response is triggered, preparing the entire plant for a possible attack from a pathogen. The cutting-edge formulation of UPSIDE® optimizes contact between UPSIDE® and the parts of the plant being treated, improving the effectiveness of the treatment.

Why can't I use UPSIDE® in single applications throughout the entire period?

Best practice is to apply UPSIDE® in two blocks of three consecutive applications. A break is recommended after each block in order to prevent overstimulation of the plant's immune system.

At what temperatures should UPSIDE® be used?

UPSIDE® can be used in the typical summer temperature range. The product is not broken down at temperatures at which fungal growth can also occur. At extreme temperatures, the plant's metabolism is less efficient, and physiological processes can be impaired. Downy mildew (*Plasmopara viticola*) cannot develop in such extreme conditions either.

Does UPSIDE® affect other yeasts or microorganisms on the leaf surface?

UPSIDE® contains cell wall fragments that are no longer viable as such. So far, no effect on other yeasts and/or microorganisms on the leaf surface has been noticed.

Does the product cause delayed growth in the plant, as the plant needs energy to build up the systemically induced resistance?

The cutting-edge formulation of UPSIDE® optimizes the plant's use of the resources. The plant's initial response to the application of UPSIDE® leads to minimal diversion of resources. If no infection occurs after an application of UPSIDE®, there are no visible signs of impaired growth and the plant continues to concentrate on its metabolic tasks.





Does the yeast contained in UPSIDE® affect the subsequent fermentation process and the pre-harvest interval?

UPSIDE® has shown no effect on the fermentation process, even when it was applied just before harvest. The yeast lysate solely contains dead cells, which are present in the formulation in tiny fragments. According to the applicable regulation, UPSIDE® is exempt from the maximum residue limits. Consequently, there is no need to stipulate corresponding maximum residue levels. If UPSIDE® is used in combination with other products with a quarantine time, the longer pre-harvest interval must be observed.

What products can UPSIDE® be mixed with?

UPSIDE® is physically miscible with most plant protection products that are commonly used in viticulture.
A small-scale compatibility test on the culture/variety is recommended when using a new mixture with UPSIDE®.

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Strengthens the plant's natural immune system

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Is residue-free and supports resistance management

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