
# An Introduction to Corteva Biologicals Europe

January 2022

CORTEVA™ agriscience

# Integrated Solutions for European farmers

# Biologicals

## Biocontrol

- Biochemicals
  - e.g., plant extracts, fermentation-based natural substances
- Pheromones
- Microbials
  - e.g., bacteria, fungi, viruses

## Biostimulants

# Biologicals - EU sustainable agriculture

## Harnessing the power of nature

- With **nature as a starting point**, more opportunities to develop solutions with **favourable toxicological and residue profile**
- Fostering the **uptake of Integrated Pest Management** across Europe

## Biologicals as part of integrated solutions

- **Not a one-to-one replacement** for conventional crop protection tools; efficacy dependent on crops, location, agronomic conditions and other parameters
- Valuable **as part of integrated solutions**, supporting pesticide use and risk reduction

## Supporting the EU Green Deal

- EU ambition to **promote alternatives** to conventional pesticides and promote organic farming
- **Societal demand** for more natural solutions, including in agriculture and food

## Our industry-wide commitment

- CropLife Europe commitment **to invest 4 billion euros in biopesticides by 2030**
- **Corteva ramping up investment** with dedicated biologicals portfolio

# Global Product Launches Timeline *(as of Nov 2021)*

biologicals

## 2021

- Utrisha™ N — NUTRIENT EFFICIENCY OPTIMIZER
- Capirel™ — CONTROLADOR BIOLÓGICO
- Amylo-X™ SC — FUNGICIDA BIOLÓGICO

## 2022

- Omsugo™ P — OTIMIZADOR DA EFICIÊNCIA NUTRICIONAL
- Omsugo™ ECO — OTIMIZADOR DA EFICIÊNCIA NUTRICIONAL
- Sosdia™ — MITIGADOR DE ESTRESSE ABIÓTICO
- Sosdia™ Stress Plus — ABIOTIC STRESS MITIGATOR
- Kinsidra™ Graw — BIOSTIMULATOR
- Kinsidra™ Start — STIMULATEUR DE CROISSANCE
- Elagesk™ Sf — BIOINSETICIDA
- Hearken™ — BIOLOGICAL INSECTICIDE
- Tezpetix™ Isa — BIOINSETICIDA
- Tezpetix™ Beauve — BIOINSETICIDA
- Inlayon™ — BIONEMATICIDA
- Inlayon™ ECO — BIONEMATICIDA
- Enrapta™ Tuta Press — MATING DISRUPTION PHEROMONES
- Enrapta™ Labesia Press — FEROMONAS DE CONFUSIÓN SEXUAL
- Bexfond™ — BIOLOGICAL FUNGICIDE
- Subelus™ — BIOFUNGICIDA

## 2023

- Enrapta™ Grapholita — MATING DISRUPTION PHEROMONE
- Enrapta™ Cydia — MATING DISRUPTION PHEROMONE

## 2024+

- Holzem ™ Biofungicide
- GA342 Biofungicide
- AFX-1 Biofungicide
- NOVO 1020 Bioinsecticide

- We screened over 200 technologies in 2020-21
- 19 we selected to launch in 2021 to 2023
- 2022 represents both the magnitude of our success and the magnitude of our launch bottleneck

# Biologicals Product Portfolio

# Biologicals Portfolio - Europe

***Biochemicals and naturally-derived***

**Qalcova™ active**

› *Spinosad:* Natural origin insecticide used over 200 crops by both conventional and organic farmers across Europe

**Jemvelva™ active**

› *Spinetoram:* Award-winning insecticide of natural origin with broad pest spectrum

**Inatreq™ active**

› *Fenpicoxamid:* Natural origin fungicide with unique mode of action for *Septoria* control on wheat

GREEN CHEMISTRY
A U.S. EPA Program

***Micro-organisms***

**AF-X1 2021**

› *Aspergillus flavus MUCL54911:* Innovative natural solution to control aflatoxin levels in maize

# Biologicals Portfolio - Europe

## *Pheromones*

**Enrapta™ Grapholita Press**
- Highly specific mating disruption method to control the Oriental fruit moth in peaches and other stone fruits

**Enrapta™ Tuta Press**
- Mating disruption pheromones against the tomato leafminer (*Tuta absoluta*), a major destructive invasive species

**Enrapta™ Lobesia Press**
- Mating disruption tool controlling the European grapevine moth *(Lobesia botrana)*

**Enrapta™ Cydia Ball**
- Mating disruption solution encapsulated in balls applied by gun for targeted control of codling moth (*Cydia pomonella*) in nuts – Cydia Press available for orchards

## *Biostimulants*

**Utrisha™ N**
NUTRIENT EFFICIENCY OPTIMIZER
- *Methlylobacterium symbioticum:* Innovative solution providing nitrogen to the plant by converting dinitrogen into ammonium

**Lumidapt™**
GROWTH NUTRITION SEED TREATMENT
- Natural origin seed treatment biostimulant enhancing nutrient and water uptake for corn, sunflower and oilseed rape - Ympact™ available for cereals

# 1. Biochemical example: Spinosad

- Product of **natural origin** cleared for **use in organic food production**
  - Fermentation by the naturally-occurring soil bacteria, *Saccharopolyspora spinosa*
- Approved for use on a wide array of crops including extensive range of **minor uses/specialty crops**
  - Over 200 crops in 24 EU Member States
- Controls a **broad spectrum of pests** including problematic and invasive species
  - Including Thrips, Lepidoptera, Diptera, Drosophila Suzukii
- **Unique Mode of Action**: no cross-resistance to any other chemical class
- Uniquely short pre-harvest intervals, majority are 1-3 days
- **Compatible in IPM programs**
- Many years of safe use with no unacceptable environmental effects observed

*Saccharopolyspora spinosa* (left) and *S. spinosa* colony (right)

➢ **An indispensable pest control solution for both conventional and organic farmers in Europe, meeting societal demand for natural origin solutions and a more resilient and sustainable EU agriculture**

# 2. Micro-organism example: AF-X1

## Mycotoxins such as aflatoxins are a major food safety concern in the EU

- Aflatoxins are fungi-produced toxins found on crops such as maize
- Climate change is expected to lead to increased aflatoxins occurrence in Europe
- Aflatoxins are known to be carcinogenic and genotoxic for human and animal health
- Maximum limits are set at EU level and aflatoxins management is a priority for the agri-food chain and public authorities

## AF-X1 is a natural solution to control aflatoxins in maize

- Developed by Corteva and commercially available since 2015 in Italy
- Based on an atoxigenic *Aspergillus flavus* strain 54911
- Provides an effective reduction in aflatoxin concentration in harvested produce

➢ **Mitigating the impact of climate change can start on the field with this natural micro-organism solution against aflatoxins in corn, a major food and feed safety issue**

# 3. Pheromones example: Enrapta™ Tuta Press

## Mating disruption method against the Tomato leafminer (*Tuta absoluta)*

- Highly specific solution with no impact on beneficial insects or pollinators
- No residues
- Compatible with organic production

## *Tuta absoluta* is an invasive species causing significant economic damage to EU tomato production

- Spreading across Europe since 2007, *Tuta absoluta* is difficult to control and can cause up to 80-100% yield losses in tomato crops
- In the Netherlands, the economic impact has been estimated at between €5 and 25 million per year
- In Italy, an outbreak of *Tuta absoluta* contributed to damage around 25% of tomato production in the 2018/2019 winter

➢A natural pheromone to control an economically damaging invasive species on a key crop for EU consumers

# Biostimulants Overview

Biostimulants stimulate natural processes to enhance:

1. nutrient uptake, nutrient efficiency
2. tolerance to abiotic stress
3. crop quality

With benefits for yield and vigor

**Raw materials include seaweeds, plant extracts, humic and fulvic acids, hydrolysed proteins and micro-organisms, among others**


## Biostimulants improve nutrient use efficiency.

→ Helps reduce nutrient losses to the environment and improves farmer ROI for fertilizer use

## Biostimulants improve crop quality.

→ Improves farmer income and can help meet technical demand with less output (e.g. higher density nutrient content in crops for feed)

## Biostimulants improve crop vigour.

→ Improves tolerance to harsh growing conditions (abiotic stress)

Source: European Biostimulant Industry Council

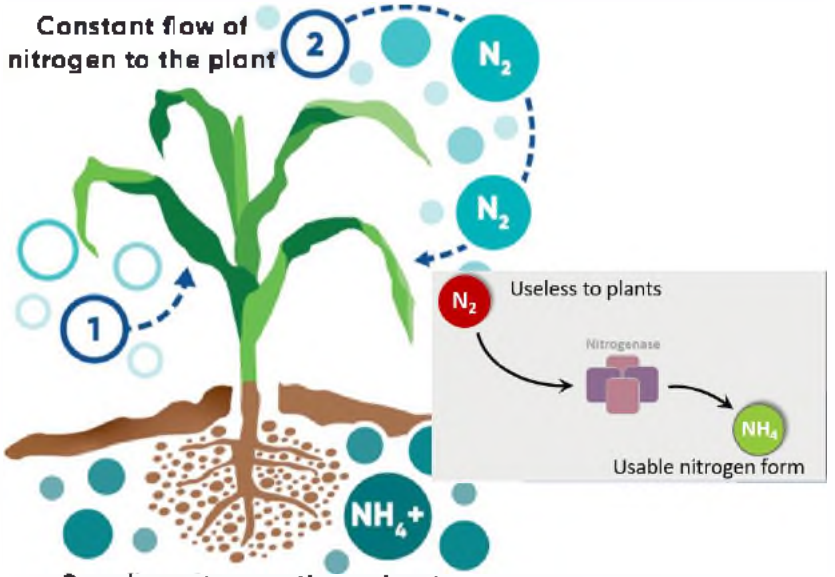
# Utrisha™ N

## Nitrogen efficiency via air fixation

- *Methylobacterium* converts N2 from the air into ammonium
- Naturally provides nitrogen to the plant
- Cleared for use in organic agriculture

## A natural solution to manage nitrogen

- An alternative source of nitrogen for crops
- No GHG emissions or nitrate leaching to groundwater
- 33kg needed for 100ha v. 50 tons of N fertilizers




➢A win-win scenario between sustainability and productivity with a natural nitrogen management solution

# Biostimulants - EU sustainable agriculture

## Supporting the EU Green Deal

- Biostimulants contribute to the **EU objective of 50% nutrient losses reduction** by improving nutrient uptake and use efficiency and enhancing crop quality
- Improving plant **resilience to abiotic stresses** and increase **soil fertility**

## Towards a greener Common Agricultural Policy

- **Increasing agricultural productivity** in a sustainable way
- CAP objective to conciliate yield increase with **reduced environmental impact**

## Meeting the EU Climate target

- Biostimulants help crops better adapt to climate change with **resilience towards abiotic stresses such as floods and drought and reducing greenhouse gas emissions**
- Improving climate resilience will **regenerate soil health and reduce erosion**

## Fostering biodiversity

- Biostimulants can **add beneficial micro-organisms** to the soil and increase soil fertility
- Potential to **reduce impact of nitrification** on biodiversity and reduce gas emissions


Thank you

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