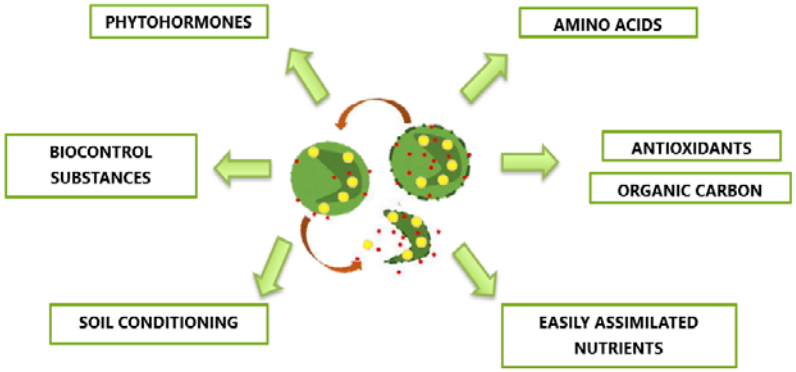
# WHAT ARE BIOSTIMULANTS?

Biostimulants are biological substances that act on the physiology of the plant in different ways and through different ways, improving the productive and growth capacity, the vigor of the crop, the yield and quality of the harvest. They contain substances and/or microorganisms whose function is to stimulate natural processes to improve the uptake, assimilation and efficiency of nutrients, tolerance to abiotic stress, and the quality of crops.

Therefore, they contribute to the reduction of inputs and mainly of nitrogen sources, which means reducing the use of fertilizers and getting closer to the goals suggested in the European Union with the "From Farm to Fork" strategy.

In addition, they try to respond to the new challenges facing agriculture, with the search for more sustainable solutions with the environment and improving the productivity of crops. It is an alternative already applied in agriculture 4.0




The formulations developed in the project are in liquid format, so they must be diluted with irrigation water in a certain dose (which varies with the type of crop) in order to be applied at the appropriate times.

**BENEFITS**

TOLERANCE TO ABIOTIC STRESS
Extreme temperaturas
Drought / Floods

TOLERANCE TO BIOTIC STRESS
diseases and pests

BETTER PERFORMANCE
Root growth and branchesImproves flowering and fruits

BEST POSTHARVEST
Improves shelf life and storage
Improves nutritional composition

**APPLICATION MODE**

FOLIAR
Aspersion
Spray
Others

ROOT
Fertigation
Hydroponics

**DIFFERENCES BETWEEN FERTILIZER AND BIOSTIMULANT**

| FERTILIZER | BIOSTIMULANT |
|---|---|
| Essential nutrients for plants | Improve the incorporation of nutrients |
| They do not improve stress tolerance | Improve tolerance to pests or biotic stress |
| They do not improve the incorporation of nutrients | Its origin can be a by-product of organic origin |
| They are used in large quantities | They are applied in small quantities |

PestNu
https://pestnu.eu/

neoalgae

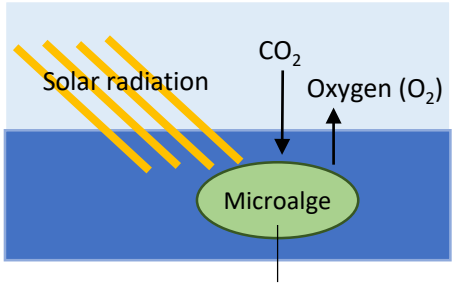
This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 101037128.

## What are microalgae?

Microalgae are **unicellular microorganisms** that have the ability to carry out **photosynthesis**. That is, they are capable of **generating organic biomass from $CO_2$ and light**, using water as an electron donor, oxidizing it to $O_2$.

They are the basis of food webs and their large number of species and their versatility allow them to be used successfully in **different industrial fields**.

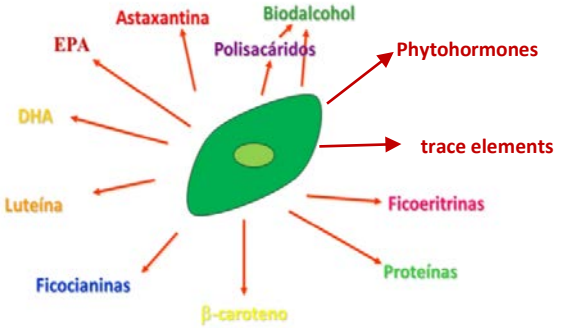
They are present in all environments with water (lakes, seas and rivers), but also in the soil and in most terrestrial environments, even the most extreme, which makes it possible to find them widely distributed in the biosphere, adapted to a large number of conditions




## Why do we use microalgae?

Microalgae **biomass performs beneficial biochemical and physiological functions** such as growth promotion, antioxidant, anti-inflammatory and immunomodulatory functions.

**In the field of agriculture they are especially beneficial** because they **promote plant growth and increase tolerance to different types of biotic** (ie insects, fungi, etc.) **and abiotic** (drought, salinity and any other adverse climatic factors) **stress**. They are capable of releasing several biologically active molecules such as phytohormones, polysaccharides, amino acids, so they have potential as a natural fertilizer.




## Benefits of microalgae

- **SUSTAINABLE AGRICULTURE:** their cultivation does not require agricultural land, so they do not compete with crops for food.
- **THEY GROW IN ALL TYPES OF WATER:** brackish, residual, fresh or salt water, they do not require drinking water.
- **HIGH PRODUCTIVITY: Its rapid growth cycle and daily harvest guarantee the highest quality.**
- **INEXHAUSTABLE SOURCE OF NUTRIENTS:** fatty acids, amino acids, proteins, antioxidants, pigments, etc... All of them are essential elements in all stages of life.
- **CAPTURE $CO_2$** and convert it into oxygen: they form the most efficient ecosystem on the planet

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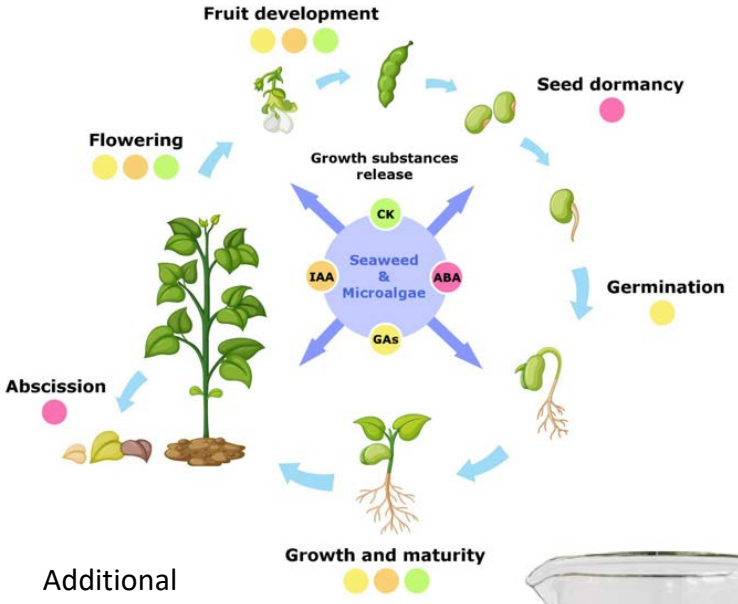
# BIOSTIMULANTS IN THE PESTNU PROJECT

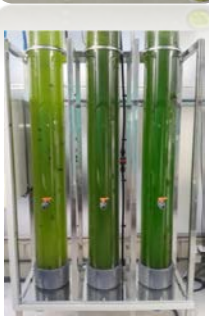
To achieve this, a new biotransformation process was developed that required the study of different parameters and at different scales, from the laboratory to a more industrial scale in order to produce the biostimulants necessary for field validation tests. What is achieved with this process is to treat the raw materials used to obtain a biostimulant with a high concentration of amino acids, olisaccharides, trace elements and antioxidants, among other compounds, thanks to which the beneficial properties are increased.

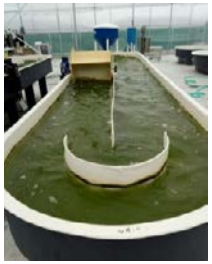



## The developed proccess

Waste water from hydroponic cultures

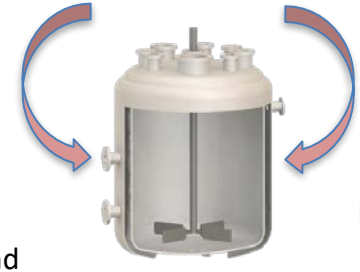
Microalgae Cultures





water

Additional ingredients



Harvesting and sedimentation

Biocathalysis process

Microalgae biomass


MICROALGAE BIOSTIMULANT

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