Collection of Practice Abstracts

G3

the good practices

SOIL ENZYMES

THE RESULTS OF SUSTAINOLIVE

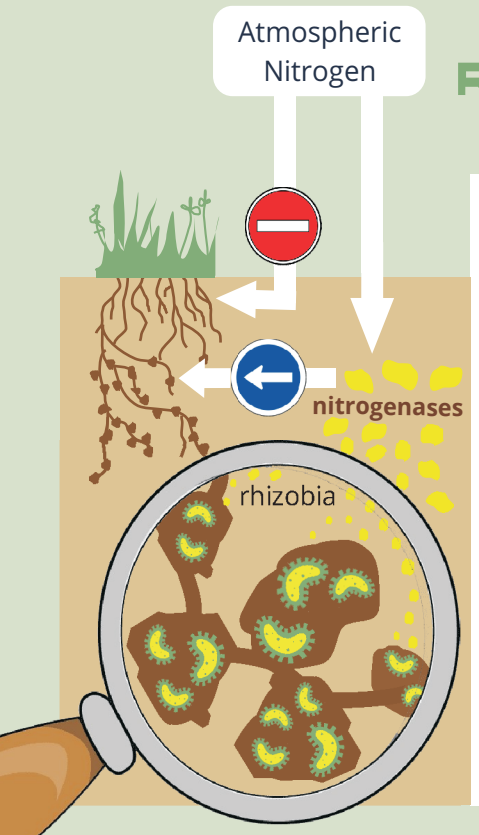
SUSTAINOLIVE.EU

WHAT ARE ENZYMES?

They are organic molecules that regulate the chemical reactions taking place in a living system such as the soil. Not only do they allow reactions to develop properly but they also help speed them up.

extra info

THEIR RELEVANCE IN SOILS...



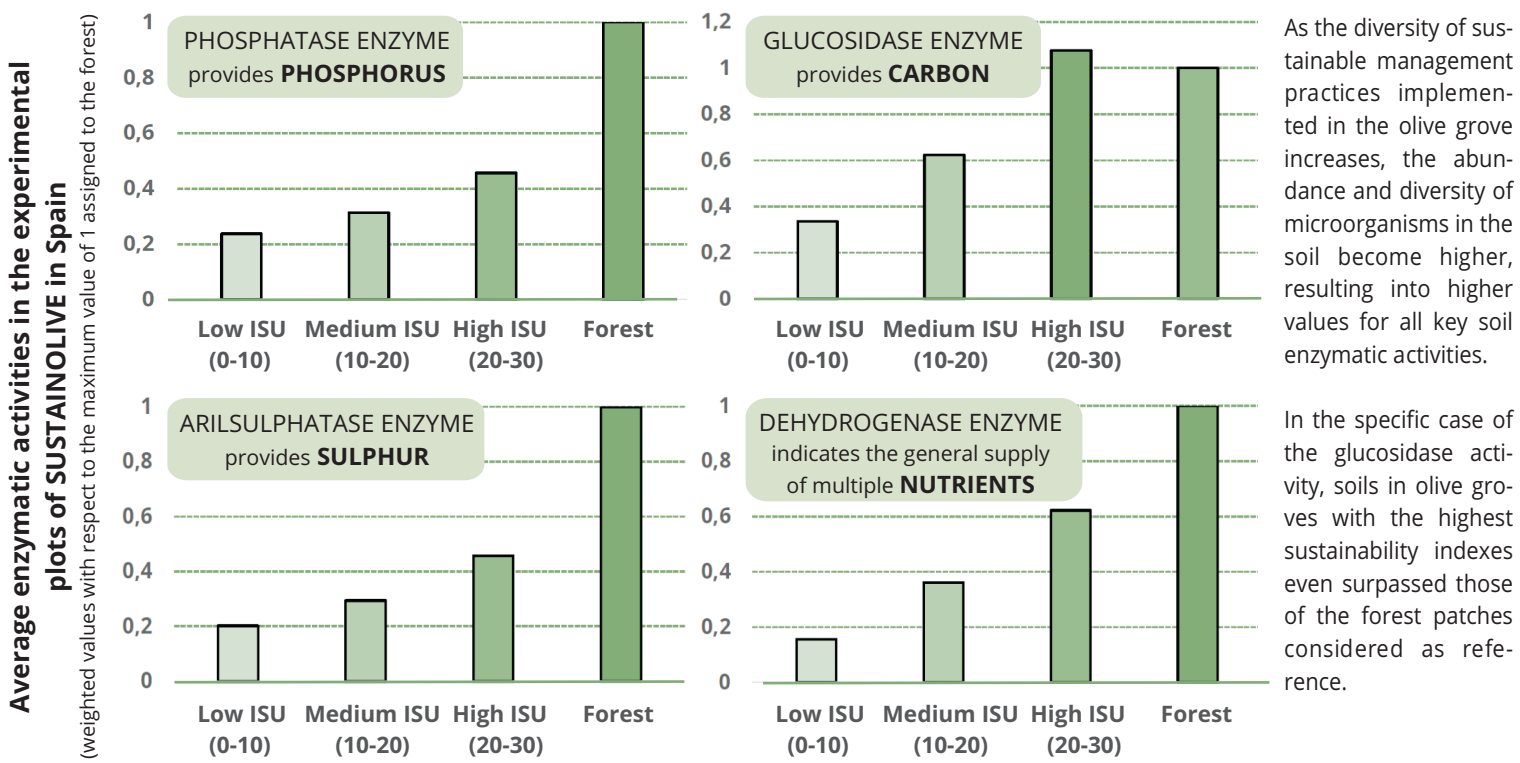
will be better understood via an example. **Nitrogenases** are a group of enzymes produced by some soil bacteria allowing to transform atmospheric nitrogen gas molecules into other chemical compounds that plants can assimilate more easily. The roots of **leguminous** plants have nodules called **rhizobia** where colonies of bacteria loaded with nitrogenases are set that supply nitrogen to the plants hosting them.

KEEP IN MIND THAT...

there is not a single indicator that by itself can determine the state of health or quality of a soil. Among all indicators available, the enzymatic activities of the soil microflora stand out because their measurement provides valuable information on:

- ✓ the ability of the soil to transform complex forms of carbon from organic matter into others readily available to plants
- ✓ the ability of the soil to recycle nutrients, especially those that are essential for plants (nitrogen, phosphorus, carbon and sulphur)
- ✓ the abundance of microorganisms that are beneficial for the soil

extra info



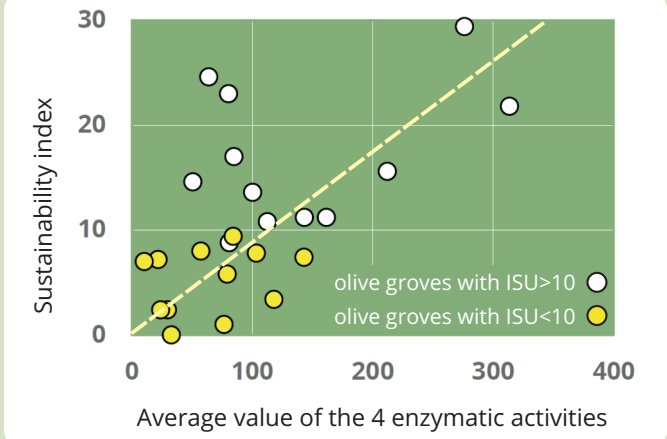
As the diversity of sustainable management practices implemented in the olive grove increases, the abundance and diversity of microorganisms in the soil become higher, resulting into higher values for all key soil enzymatic activities.

In the specific case of the glucosidase activity, soils in olive groves with the highest sustainability indexes even surpassed those of the forest patches considered as reference.

Categories of the sustainability index (ISU) used in SUSTAINOLIVE
(higher values of this index involve the application of a greater diversity of sustainable management practices)

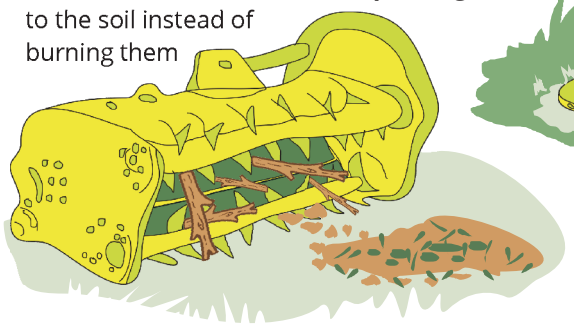
extra info

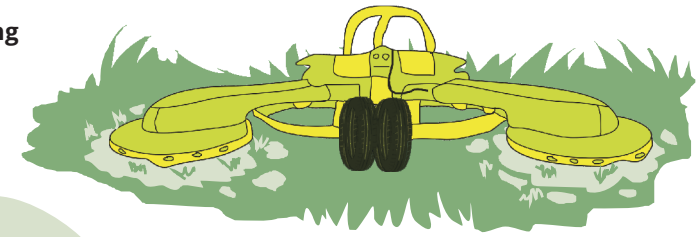
When we consider together all the enzymatic activities, it becomes evident that a direct correlation exists between the sustainability index and the intensity of the enzymatic activity of the olive grove soils. In other words, as sustainable management practices in olive groves become more diverse, the microflora in the soil improves. This means that **nutrient cycling is accelerated in the soils of more sustainable olive groves**, making nutrients more available to the olive trees. In this way, the farmer's need for chemical fertilizers is reduced.



SOME GOOD PRACTICES

Add the **shredded remains of pruning** to the soil instead of burning them





Substituting intensive tillage by **minimum tillage** and adding to the soils the **remains of cover crop clearing**, instead of keeping bare soils

Add **manure or composted olive mill pomaces** to the soil instead of chemical fertilizers

PRIMA PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA

Co-funded by the Horizon 2020 Framework Programme of the European Union

This project is part of the PRIMA program supported by the European Union

SUSTAINOLIVE: Novel approaches to promote the sustainability of olive cultivation in the Mediterranean. Research project 2019-2023

Authors: Jose Liétor, Julio Calero, Gustavo F. Ruiz-Cátedra & Roberto García Ruiz (UJA), Alejandro Gallego (TKV)
Contact: rgarcia@ujaen.es