

## WHAT IS NUTRONFERRO?

*NUTRONFERRO* is a fertiliser based on three types of chelated iron (Iron EDTA, Iron EDDHSA and Iron DTPA), which promotes the luxuriant growth of aquatic plants. Some particularly weak plants often have leaves that turn yellow, become brittle and transparent due to a lack of nutrients. The regular use of *NUTRONFERRO* prevents the weakening of aquatic flora, promotes plant growth and is free from nitrates and phosphates.

*NUTRONFERRO* is a regularly registered BIO fertiliser.

## OVERVIEW

Iron is a trace element belonging to the family of "micro elements" and is an essential element in plant biology, as it is responsible for a series of enzymatic activities and complex procedures that lead to the development of chlorophyll and of other photosynthetic pigments.

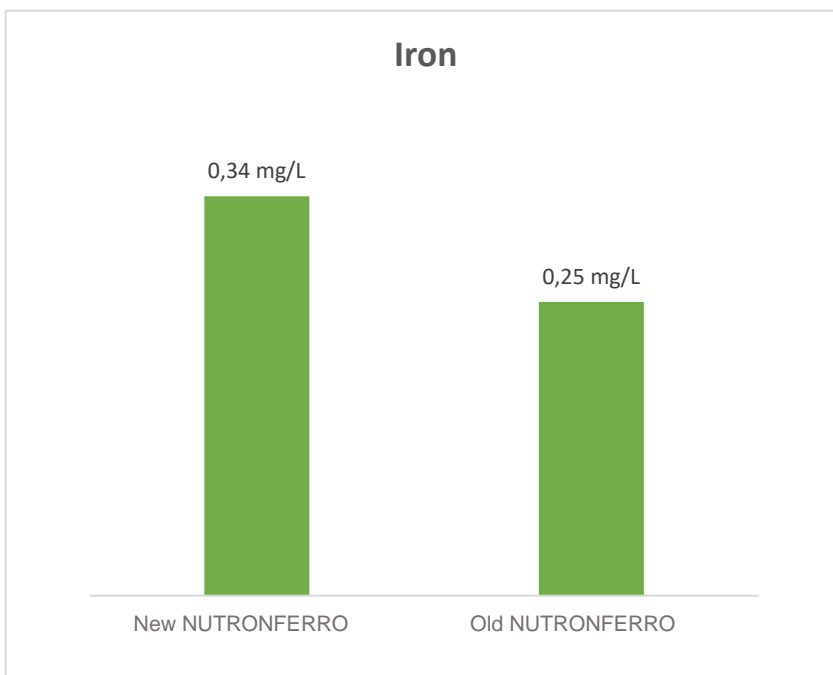
Iron must be replenished weekly as only some species of plants can store it in their stems and use it as a reserve if required or in case of prolonged absence.



## BIO!

The word "biological" derives from the Greek "bios" and means life. The new *NUTRONFERRO* contains three different chelated irons of a biological nature.

## NEW FORMULA



*NUTRONFERRO* has been improved thanks to multiple tests in our Research and Development laboratory.

A significant difference between the old and the new *NUTRONFERRO* is the composition and the quantity of iron that is increased in water and made available to plants.

We tested the old and the new *NUTRONFERRO* at the same time in a 5 Lt container containing osmotic water; we administered 0.5 mL of the new *NUTRONFERRO* and 1.25 mL of the old *NUTRONFERRO* as instructed.

We waited 5 minutes for the water to mix with the product and we checked the iron content in the water with our electronic instrumentation. We therefore represented with the graph shown above the values found.

As can be seen, the new *NUTRONFERRO* is much more concentrated than the old one. With less than half the dose of the old *NUTRONFERRO* in water there was 0.34 mg / L of Iron available for plants, unlike the old *NUTRONFERRO* which, with a double dose compared to the new one made available just 0.25 mg / L.

## HOW IT WORKS

*NUTRONFERRO* is composed of immediately assimilable iron; let's chemically analyse the product and the process by which iron is absorbed in plants:

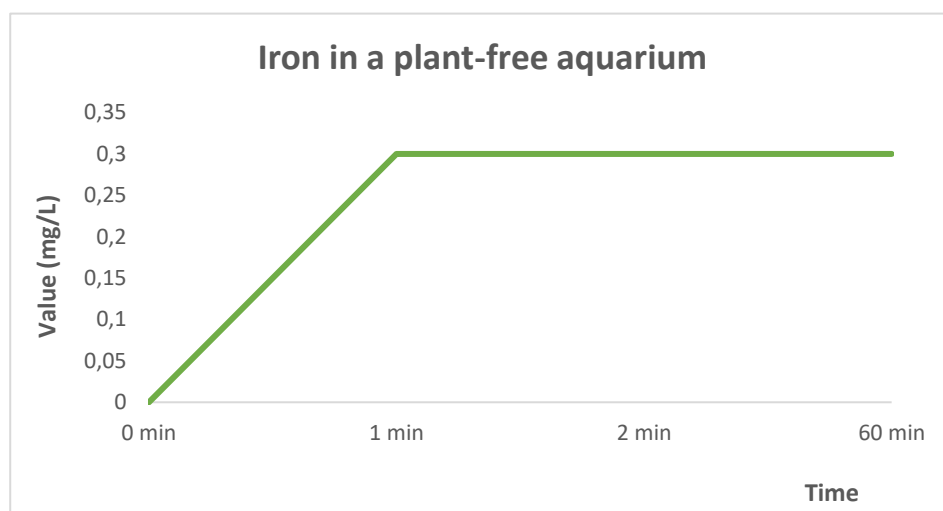
Iron occurs in two oxidation states, Fe<sup>2+</sup> (Ferrous) and Fe<sup>3+</sup> (Ferric); the ferrous state is more soluble than the ferric state which tends to precipitate, becoming difficult for plants to assimilate. In the aquarium we mainly find iron in "ferric" form which with a pH of between 7 - 7.5 tends to precipitate on the bottom and does not directly feed the plants; the iron precipitated on the bottom will still be assimilated by the roots, but this process will take much longer than direct foliar absorption.

To avoid the dispersion of non-assimilable or slowly assimilable iron by plants, *NUTRONFERRO* is formulated with three chelated irons, special types of iron that are "chelated" by trapping the iron molecule and preventing it from precipitating. Thanks to the composition of *NUTRONFERRO*, the iron present in solution is immediately available to be assimilated by plants.

The most common visual effect to verify the absence of iron in plants is chlorosis, or yellow spots that spread on the leaf to become holes.

The best way to check the amount of iron in your aquarium is to use *PRODACTEST Fe*.

## TESTS PERFORMED



We tested *NUTRONFERRO* in a 70Lt aquarium. The bottom of the aquarium is made up of *FONDOVIVO* + *WHITE QUARTZ*. The biological filter is made up of *FILTERWATTE* + *BIOCLARO* + *AQUACIL*. The pump is *MAGIC PUMP 550*, while the water inserted is tap water treated with *AQUASANA*.

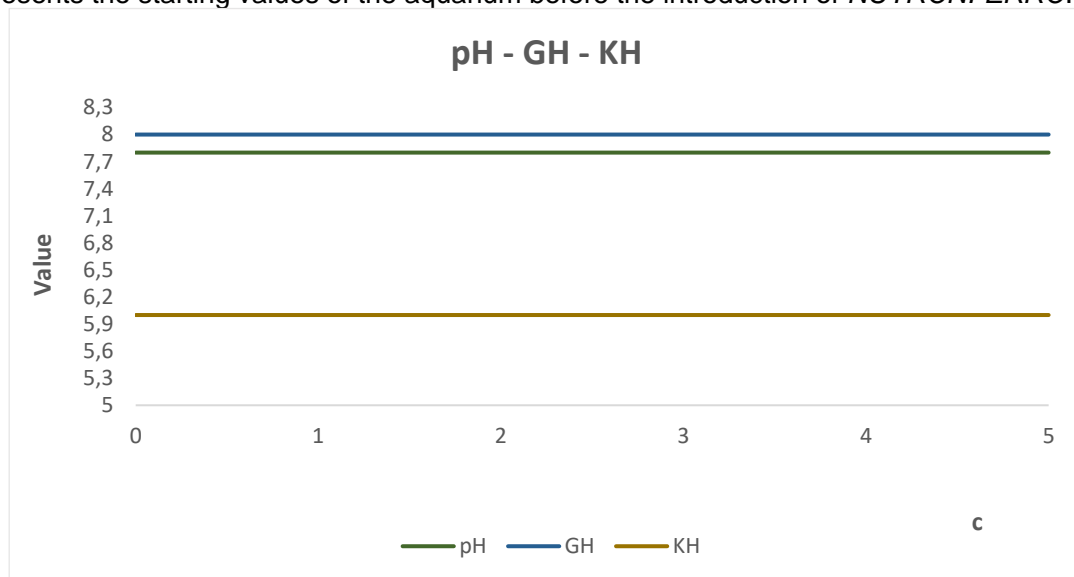
The aquarium is free from plants and fish, in order to demonstrate how the product really brings a change to the amount of iron in the water, which in the case of planted aquariums, will be immediately absorbed as required.

Before introducing *NUTRONFERRO* we measured the pH value with *PRODACTEST pH*, the GH value with *PRODACTEST GH*, the KH value with *PRODACTEST KH* and the iron value with *PRODACTEST Fe*; then we introduced 7 mL of product into the aquarium according to the instructions.

After the administration of *NUTRONFERRO* we measured the iron value with the times indicated in the "Time" axis and we reported the values found in the graph below.

For 5 days, we measured the pH, GH and KH value and reported the values found in the graph.

"0" represents the starting values of the aquarium before the introduction of *NUTRONFERRO*.

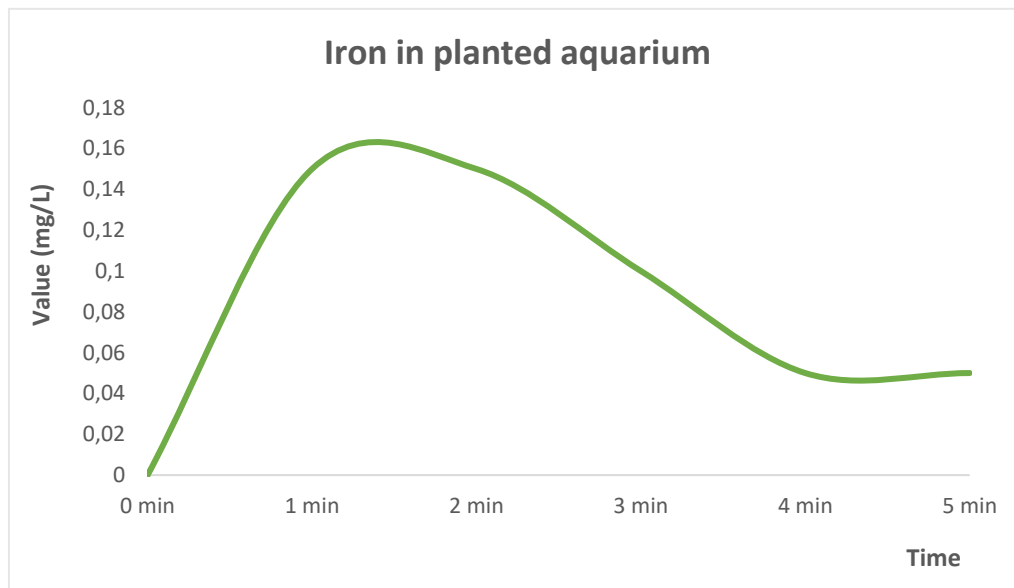


We then tested *NUTRONFERRO* in the same 70Lt aquarium described above, planted with anubias barteri ludwiga repens, Limnophila sessiflora, Lagenandra meeboldii red and echinodorus schlueteri, in order to demonstrate how the product is easily assimilated by plants.

Before inserting *NUTRONFERRO* we measured the iron value with *PRODACTEST Fe*, then we introduced 7 mL of product into the aquarium according to the instructions.

After the administration of *NUTRONFERRO* we measured the iron value with the times indicated in the "Time" axis and we reported the values found in the graph below.

"0" represents the starting values of the aquarium before the introduction of *NUTRONFERRO*.



## DISCUSSION and CONCLUSIONS

As can be seen from the first graph representing the iron value in a plant-free aquarium, the introduction of *NUTRONFERRO* immediately increased the resulting iron value in the water and did not in any way alter the pH, GH and KH values over time.

Unlike the first, with the second test carried out it can be seen that the introduction of *NUTRONFERRO* in the planted aquarium increased the iron level for roughly 2/3 minutes, after which it was absorbed for the quantity needed by the plants and reached the ideal level for the aquarium. The composition of *NUTRONFERRO* contains chelated irons that are not photosensitive to the LEDs of your aquariums, so the iron that remains available in the aquarium will be assimilated if necessary.

*NUTRONFERRO* is an excellent liquid fertiliser for plants free from nitrites, nitrates and phosphates, and is a completely harmless product for fish.

Maintaining healthy plants also helps to maintain a correct balance of aquarium values thanks to the fundamental importance of plants in the nitrogen cycle.

*NUTRONFERRO*, together with *NUTRONFLORA*, is part of the PRODAC fertiliser line and are the first allies for the healthy growth of your plants.