Fertilisers Efficiency Enhancers

Urease and Nitrification Inhibitors are efficiency enhancers contributing to reduce nitrogen losses from nitrogen containing fertilisers

Nitrification Inhibitors (NI)

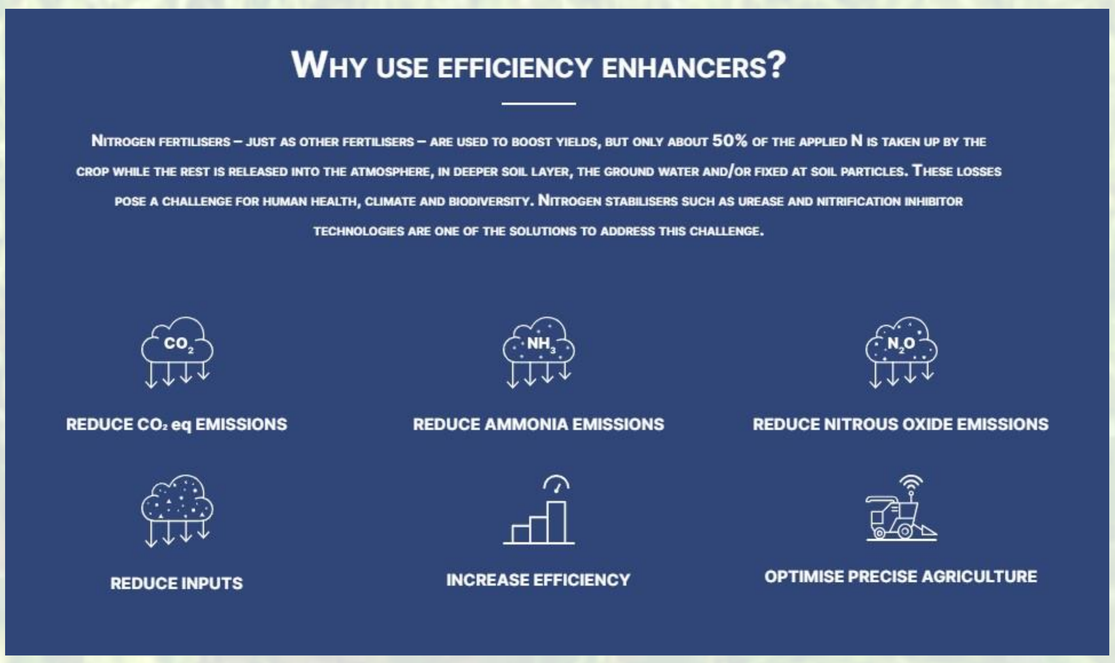
NIs can reduce nitrous oxide (N_2O) by 44% and nitrate leaching by 18% (Grados et al. 2022, Quemada et al. 2013).

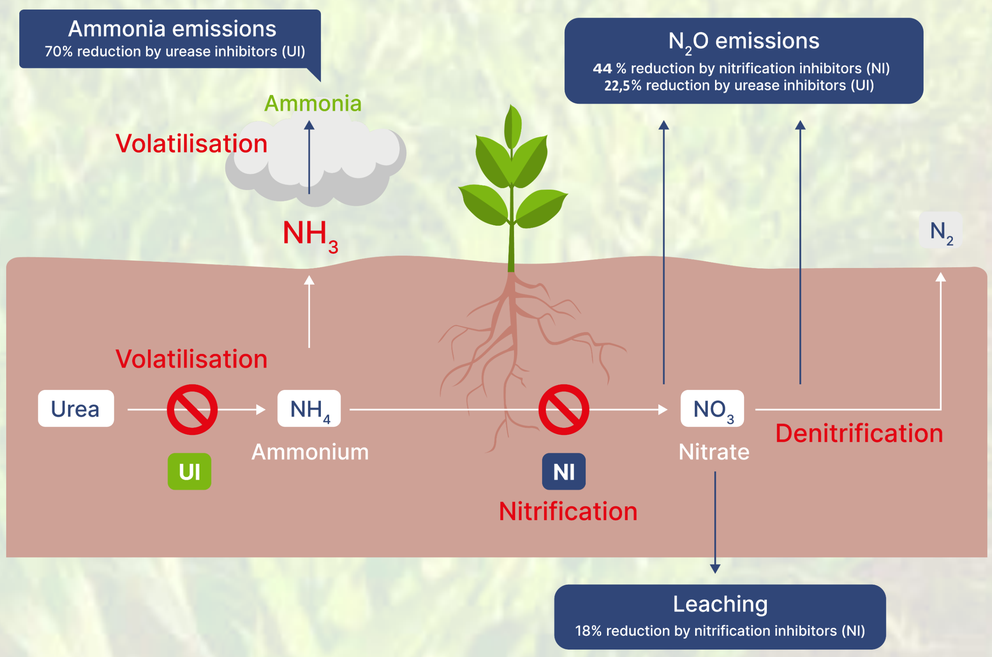
Ammonium nitrogen (NH_4^+) is converted in the soil to nitrate (NO_3-) by naturally occurring soil bacteria, and N_2O through nitrification.

Contrary to NH_4^+, nitrate is very mobile and can easily leach into ground water, resulting in eutrophication. It can be reduced in the soil to nitrous oxide (N_2O) and nitrogen gas (N_2) through denitrification.

With its global warming potential (GWP) nearly 300 times higher than CO_2, N_2O is a very potent greenhouse gas.

The use of Nis is one of the solutions to minimize N losses, since they inhibit for a certain period of time the activity of soil microorganisms responsible for the conversion of NH_4^+ to NO_3-. Consequently, N_2O emissions and nitrate leaching are reduced leading to ammonium being available to plants longer and in a form that best suits their needs.





Due to reduction of direct as well as indirect N_2O emissions (via redeposited NH_3 and NO_3- leaching), the CO_2 footprint - expressed in CO_2 equivalents - of agricultural and horticultural production systems fertilised with N fertilisers treated with NIs, can significantly be reduced without any negative impact on crop quality and yield.

According to IFA, (Fertilizers and agriculture's carbon footprint) nitrogen inhibitors can contribute significantly to the decarbonisation of the N fertiliser industry.

Urease Inhibitors (UI)

UIs can reduce ammonia (NO_3-) by 70% and direct N_2O emissions by 22,5% (Bittman et al. 2014, Grados et al. 2022).

During transformation of urea to NH_4 in soil, N losses in form of ammonia (NH_3) can occur which can negatively affect crop yield and/or its quality. NH_3 forms, with particulate matter, smog causing health problems for humans, and can redeposit on soil and water causing eutrophication and acidification in non-agricultural areas, (e.g. forests and non-fertilised grassland), which can have negative effects on biodiversity.

UIs slow down, for a certain period of time, the hydrolysis of urea. As a result, less N in form of NH_3 and N_2O is released into the environment and remains available for growing crops.

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Fertilisers Efficiency Enhancers is a Sector Group of Cefic, the European Chemical Industry Council. We act as a forum of the value chain of nitrogen stabilisers and other efficiency enhancers in Europe and promote the agronomic and environmental benefits of nutrient enhancers in fertiliser applications.

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