

The nitrification inhibitor DMPP (ENTEC®) for use in agricultural crops



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Abstract:

Nitrification inhibitors can reduce the environmental problems caused by N (nitrate leaching, N volatilisation losses) by curbing the activity of the soil bacteria *Nitrosomonas ssp.*, responsible for the transformation of ammonium into nitrite. They retard this process over a certain period of time.

DMPP (3,4-dimethylpyrazole phosphate; ENTEC® = reg. TM of COMPO GmbH & Co. KG, Münster, Germany) is a new and high efficient nitrification inhibitor, developed by BASF AG. DMPP is effective at low application rates and can be added to solid or liquid fertiliser that contains ammonium or urea.

Besides its environmental benefits DMPP has advantages for farmers and vegetable growers: increased yields, often better yield quality and a higher percentage of marketable yield.

Introduction:

Nitrification inhibitors retard the natural transformation of ammonium into nitrate, by inhibiting the activity of *Nitrosomonas ssp.*, the bacteria responsible for the first step of nitrification process (conversion of ammonium into nitrite). As long as the nitrification is inhibited the soil ammonium content is increased and the nitrate content is reduced.

Since nitrate is seen as the major cause of the environmental problems caused by N (nitrate leaching, denitrification), nitrification inhibitors can significantly reduce these problems.

Only two nitrification inhibitors are commercial products (Nserve (Nitrapyrine = 2-chloro-6-(trichloromethyl)pyridine) in North America and Didin (DCD = dicyandiamide) in Western Europe.

This poster describes the properties of the new nitrification inhibitor ENTEC (DMPP = 3,4-dimethylpyrazole phosphate) by presenting selected experiments evaluating the effects of DMPP on nitrate leaching, N₂O emissions and N-efficiency.

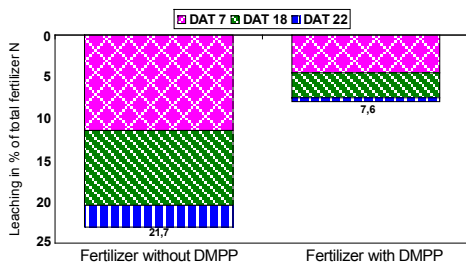
Results

Advantages of DMPP for the environment

- reduced risk of NO₃ leaching
- reduced N₂O emissions
- no increase of NH₃ emission from NH₄-based fertilisers
- no negative effect on CH₄-sorption capacity of the soil

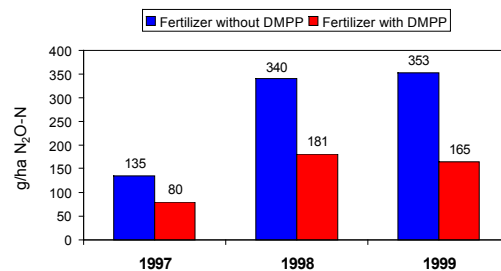
Effect of DMPP on N leaching in a pot trial with spinach

(Mitscherlich pots; loess soil; post emergence fertilizer application; approx. 20 mm supplementary irrigation per leaching)



Effect of DMPP on N₂O emissions in a field trial

(Weiske et al. 2000)



Advantages of DMPP for farmers

- often higher N efficiency: higher yields or reduced N rates
- reduced N application rounds
- often improved quality: reduced NO₃ content of vegetables, darker green, more attractive plants, high plant compatibility

Effect of DMPP on nitrogen removal by winter wheat at a rate of 180 kg/ha (data from field trials in Germany)

