Dow AgroSciences

Solutions for the Growing World

eNtrench™

INSTINCT® NITROGEN STABILISER WINS U.S. EPA PRESIDENTIAL GREEN CHEMISTRY CHALLENGE AWARD

NITROGEN STABILISER

Instinct® (sold as eNtrench™ in Australia) nitrogen stabiliser from Dow AgroSciences, was developed to help farmers protect their crop yields as well as the environment by helping to keep nitrogen in the root zone. Today, the company's achievement with nitrogen stabilisation has won a U.S. Environmental Protection Agency (EPA) Presidential Green Chemistry Challenge Award.

Dow AgroSciences has previously won five U.S. EPA Presidential Green Chemistry Challenge Awards for agricultural technology, illustrating the company's emphasis on developing sustainable solutions and delivering breakthrough innovations in line with Dow's 2025 Sustainability Goals.

eNtrench® nitrogen stabilizer has been on the market since 2012 and can be conveniently used with commonly applied fertilizers to stabilize applied nitrogen. It has growing adoption in the cane industry.

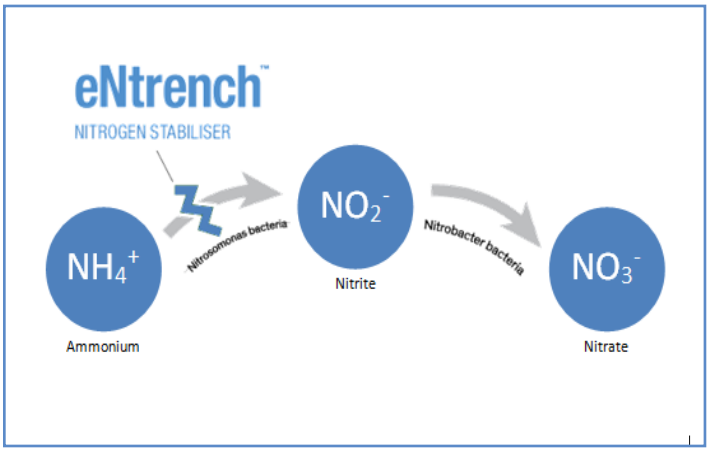
Farmers are working to keep their farms productive for generations to come, and award-winning nitrogen management products like eNtrench can support the long-term health of their soil and water resources. Dow AgroSciences partners with farmers around the globe to achieve this vision, as the award-winning technology found in eNtrench is also currently available in a number of regions outside the U.S., including the European Union, Canada, Australia, and China under the brand names N-Lock™ and eNtrench™.

ENTRENCH NITROGEN STABILISER AND SOIL MICROBES

Does eNtrench kill soil microbes? No.

Since discovery in the 1970's eNtrench has been researched for more than 40 years by Dow AgroSciences and independent scientists. Much of this work has been done in laboratory studies, where in some cases and conditions, eNtrench has given control of some soil bacteria involved in Nitrogen loss in soil.

However, in field work conducted as far back as 1980, the results have been different. It showed eNtrench works as a bacteriostat, which means it puts the soil bacteria in a holding pattern, but does not control them[1]. The authors said in field experiments Nitrapyrin (the active ingredient in eNtrench) injected at 1.5kg/ha (equivalent of 7.5L/ha eNtrench) with liquid urea, did not affect numbers of (ammonia oxidising) bacteria in cross sections of the injected band of soil.



More recent research in Western Australia, by Fisk et al. (2015) has shown that Nitrapyrin was very effective at increasing ammonia retention, and decreased gross nitrification rates, while at the same time leaving bacterial ammonia oxidiser gene abundance unaffected[2].

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ENTRENCH NITROGEN STABILISER AND HEALTH

Nitrapyrin, the active ingredient in eNtrench, is not classified as a carcinogen under the Globally Harmonized System (GHS). GHS is an internationally adopted system, created by the United Nations, to classify chemicals according to their health, physical and environmental hazards. GHS communicates health and safety information on labels and SDS's.

eNtrench was initially approved by NICNAS in Australia in 2012, through the industrial chemical review program. It is the only product of this type in Australia that has undergone that review for approval for use.

During that review the existing data determined that Tthe initial label contained the following statements for Hazard of "limited evidence of carcinogenic effects" and for Risk of "kidney effects and and/or tumours have been observed in male rats. These effects are unlikely to occur in humans. NICNAS concluded eNtrench is not considered to pose an unreasonable risk to worker or public health when used in the proposed manner".

In 2016, in preparation for Australia's move to GHS, the cancer risk statement from the SDS and product label has been removed.

Farmers can use eNtrench with the confidence it will not cause cancer when used as directed. As for all farm inputs, users should take label recommended precautions for safety and personal protective equipment.

Ongoing research and review of the occupational health and safety of Nitrapyrin is presently underway in the USA with the Environmental Protection Agency (EPA). A further positive change to the EPA classification is anticipated in 2017.

Under GHS, eNtrench is only classified as an aquatic hazard (see opposite for the GHS classification that will appear on the SDS and label.)

GHS Classificiation
Acute aquatic toxicity - Category 2
Chronic aquatic toxicity - Category 2

GHS label elements
Hazard pictograms

Hazard statements
Toxic to aquatic life **with long** lasting effects
Precautionary statements

Prevention
Avoid release to the environment

Response
Collect Spillage

Disposal
Dispose of contents/ container to an approved waste disposal plant.

References

1. Rodgers, G. A. and Ashworth, J. (1982). Bacteriostatic action of nitrification inhibitors. ***Can. Jnl. Microbiol.,*** *Vol. 28, pp, 1093-1100.*
2. Fisk, L. M. etal. (2015). Nitrapyrin decreased nitrification of nitrogen released from soil organic matter but not amoA gene abundance at high soil temperature. ***Soil Biol. And Biochem.,*** *Vol. 88, pp. 214-233.*

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