

Information note

Urease inhibitor fertiliser in National Greenhouse Gas Inventories and Projections

How are national inventories updated with the latest science?

The EPA incorporates the latest scientific information, including on new technologies, in the National Greenhouse Gas Inventories and Projections. This arises through the adoption of new international guidelines on inventory compilation and from national and international research.

In introducing new science and improvements to the inventories, the EPA follows the principles set out in the emission inventory guidelines set out by the Intergovernmental Panel on Climate Change (greenhouse gas emissions)^{1,2} and European Monitoring and Evaluation Programme/European Environment Agency (air pollutants)³. Some of the key principles that the EPA follows include:

- Ensuring measurement data covers a representative sample and that suitable measurements have been used.
- Preferring the use of measurement methods developed by official standards organisations and field-tested to determine their operational characteristics.
- Developing Ireland specific emission factors for key categories, with the goal to improve the accuracy of relevant emissions and removals estimates.
- Verifying that emission factors derived from direct measurement are representative of Irelands circumstances.
- Referencing peer-reviewed, published literature relevant to Irelands circumstances as this should provide the most accurate representation of practices and activities.

As part of both international reporting obligations and continuous improvement processes, Ireland's national inventories are reviewed annually by both the EU and the UN. Recommendations arising from these reviews⁴ allow the identification and prioritisation of national greenhouse gas and air pollutant emission research. Subsequently, research projects funded by both the EPA and other public bodies, with associated national and international technical committee participation by the EPA's Emission Statistics Team, ensure the increasing robustness of emissions estimation.

¹ https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/1_Volume1/19R_V1_Ch02_DataCollection.pdf

² https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/1_Volume1/19R_V1_Ch04_MethodChoice.pdf

³ <https://www.eea.europa.eu/publications/emep-eea-guidebook-2023/part-a-general-guidance-chapters>

⁴ Latest UNFCCC review report: <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/inventory-review-reports-2022>

What urease inhibitor products are currently reflected in the National Greenhouse Gas and Air Pollutant Inventories and Projections?

Environmentally, there are two key benefits to using urease inhibited (or 'stabilised') fertiliser products:

1. the reduction of emissions of ammonia, an important air pollutant, when compared to the use of 'straight' urea;
2. when used as a replacement for Calcium Ammonium Nitrate (CAN), a reduction in nitrous oxide emissions, a potent greenhouse gas.

As outlined in the international guidelines for national inventories and projections above, research should be conducted at field scale, covering a range of soil types and environmental conditions so that efficacy of any particular product is demonstrated at field level under the conditions in which it will be used.

The following fertiliser products have met the criteria for inclusion as urease inhibitor products within the national greenhouse gas and air pollutant Inventories and Projections 1990-2022:

- N-(n-butyl)-thiophosphoric triamide (NBPT)
- N-(n-propyl)-thiophosphoric triamide (NPPT)
- N-(n-butyl)-thiophosphoric triamide (NBPT) + N-(n-propyl)-thiophosphoric triamide (NPPT)
- N-(2-nitrophenyl) phosphoric triamide (2NPT)

The most relevant national research demonstrating efficacy at field level (Forrestal et al. 2016⁵; Harty et al., 2016⁶; Roche et al., 2016⁷) provide the evidence base for the inclusion of these products. 2NPT's mode of action is similar to that of NBPT, however, to date it's use in Ireland has been minor.

If/when information is provided on new products that meet the criteria specified these products will be added to the list above. The emission or abatement factor is applied from the time the product was placed on the Irish market and retrospectively across the time series in instances where a product has been on the market prior to provision of supporting evidence. In the absence of robust scientific evidence then the emission factor for straight urea is applied.

<https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/frequently-asked-questions/>

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⁵ <https://doi.org/10.1111/sum.12232>

⁶ <https://doi.org/10.1016/j.scitotenv.2016.04.120>

⁷ <https://doi.org/10.1016/j.agee.2016.08.031>