FACTSHEET

Low emissions – focus on ammonia

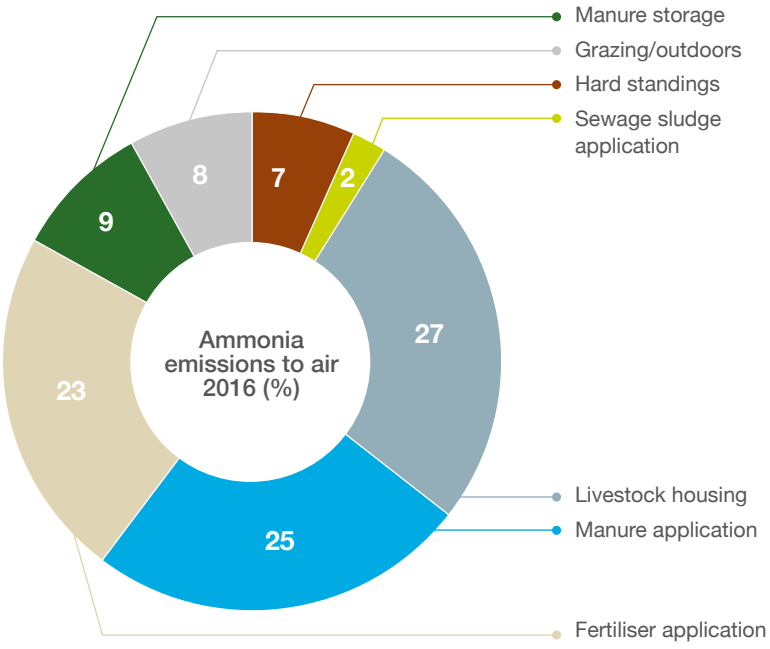
Dairy cow housing is a major source of ammonia

Why is ammonia important?

Ammonia gas is released to the atmosphere from cattle manures and slurries. Housing, manure and slurry handling, storage and spreading all contribute to this pollution along with nitrogen fertilisers. In the UK, 88 per cent of ammonia released to the air comes from agriculture. Ammonia reacts with other compounds in the air to form secondary particulate matter (PM), which significantly impacts on human health. Visually, ammonia contributes to smogs in urban areas. Ammonia also damages sensitive habitats such as woodlands, heaths and lakes and contributes to acidification of agricultural soils and the eutophication of waterways.

What is Government doing?

A Government consultation paper (Clean Air Strategy) was released in May 2018, which, while inviting responses, gave a clear indication of the intended direction of travel to meet internationally binding emission reduction targets. The government is committed to reduce emissions of ammonia by 8 per cent by 2020 and 16 per cent by 2030 from a 2005 baseline measurement.

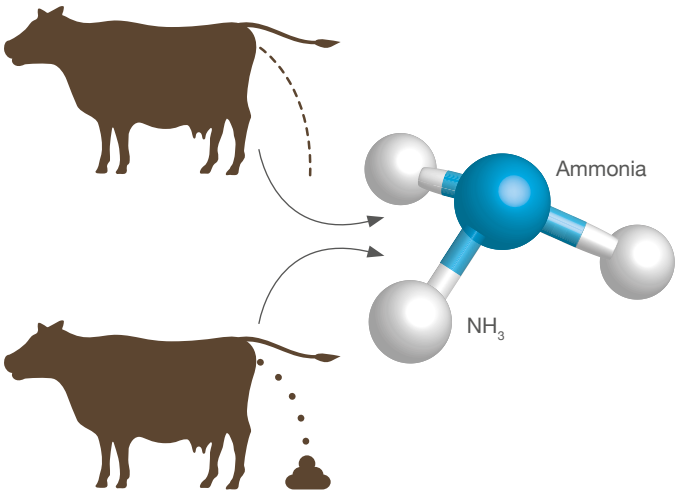


Source: Defra Air Quality division

DAIRY

How is ammonia from agriculture produced?

Ammonia is emitted when urea contained in urine reacts with the urease enzyme contained in faeces. Separating faeces and urine as soon as possible or frequently removing them to an enclosed space will reduce the production of ammonia.



What measures can farmers take to reduce ammonia emissions?

1. Make efficient use of protein

A key element of ammonia is the surplus nitrogen excreted by animals as urinary urea. The main source of nitrogen obtained by the animal is dietary protein. So, if protein feeding is properly balanced to match requirements, less nitrogen will be excreted and less ammonia will be produced from the slurry.

Research commissioned by AHDB demonstrates that, in nutritionally balanced maize silage-based diets, crude protein levels in milking cow diets can be successfully reduced to 15 per cent with no detrimental effect on milk output or fertility. Further studies are being conducted in home-grown forage-based diets.

dairy.ahdb.org.uk/resources-library/research-development/nutrition/literature-review-reducing-protein-in-dairy-cow-diets/#.W0xpyaaovIU

www.youtube.com/watch?v=tv8oOfutwes

Farmer benefit

Nutritionally well-balanced, lower protein rations mean lower input costs.

2. Frequent cleaning of livestock areas

Keeping floors in livestock areas clean will reduce ammonia emissions. Concrete yards and passages contaminated with slurry provide an emitting surface. The amount of ammonia emitted will depend on the quantity of slurry, ambient temperature, airflow and the length of time the slurry is exposed to the air. Collecting yards, livestock handling areas and parlours should therefore be scraped and washed down as soon after use as possible. Pooling of slurry should be avoided.

Cubicle passages, feed passages and loafing areas should be designed to drain quickly and be scraped as frequently as possible. Automatic scrapers should be set to scrape every one to two hours. Robotic scrapers can be used while cows are in the cubicle building.

The rate of emitting is dependent on temperature and airflow but peak emission rates are usually seen within two hours of deposition. So frequent cleaning will reduce ammonia emissions.

Farmer benefit

Clean, dry floors will help improve foot health.

Automatic or robot scrapers can be used to increase scraping frequency

3. Covering slurry stores

Open lagoons and slurry stores allow ammonia to escape into the atmosphere. Putting a cover over the store will create a concentration of ammonia beneath the cover, suppressing further ammonia production.

Above ground tanks and below ground lagoons can both be covered with flexible sheeting systems that may be eligible for grant funding.

Covered above ground slurry store – ammonia emissions reduced by 80 per cent

Farmer benefit

Keeps rainwater out of the store, reducing the storage capacity requirement and spreading costs, increases slurry nitrogen value. Reducing ammonia emissions from stored slurry will mean more nitrogen is retained increasing its fertiliser value.

Earth banked lagoon with floating cover

4. Use low emission spreading techniques

Ammonia emissions are increased when slurry comes into contact with the air, especially in warm, windy conditions.

Trailing shoe slurry application (left), dribble bar application (right) and tanker mounted shallow injector (bottom)

Using shallow injection, trailing shoe or dribble bar equipment to spread slurry will reduce this contact and so reduce emissions. Up to 80% of the nitrogen contained in slurry can be lost to the environment when splash plate equipment is used. Shallow injection can reduce ammonia emissions at spreading by up to 70%.

Choose cooler, less windy weather conditions to spread slurry. Where possible, incorporate surface-spread slurry and FYM into the soil as soon as possible and certainly within 12 hours.

Farmer benefit

More of the nitrogen content of slurry is retained and therefore available to the crop.

5. Carefully manage any urea-based fertiliser

Urea fertiliser is vulnerable to volatilisation, releasing ammonia to the atmosphere. Consider switching from urea-based fertilisers to ammonium nitrate, which has lower emissions, injecting liquid urea into the soil or applying urea fertiliser which has been treated with a urease inhibitor. Up to 45 per cent of the nitrogen can be lost from urea based fertilisers on high pH soils.

Defra has issued a Code of Good Agricultural Practice to give guidance on actions farmers can take to reduce ammonia emissions.

Spinning disk fertiliser spreader

Farmer benefit

More fertiliser nitrogen is available to the crop.

For more information please visit
gov.uk/government/publications

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