DAIRY HERD HEALTH & PRODUCTIVITY SERVICE

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Reducing methane emissions from cows – what does the future hold?

Methane emissions from cattle (as well as sheep and goats) have been hitting the news headlines in recent years for all the wrong reasons. With the 2024 UK authorisation of the first feed additive specifically designed to reduce methane emissions from cows, there are a number of strategies that are being looked at to help reduce methane emissions from livestock farms.

A recent review in the Journal of Dairy Science (Hristov 2024, JDS 107(7) pp 4129-4146) details a number of different approaches that can be taken to reduce enteric (gut) methane emissions from cattle:

1) Diet manipulation. Various studies have shown that increasing concentrate inclusion rates and starch concentration in dairy cow diets will reduce methane emissions. Most of this work was done on US maize silage-based diets with starch concentrations in the region of 20 – 30% (or higher), which would potentially result in issues with SARA and butterfat depression…

However, substituting maize silage instead of grass silage has been shown to reduce methane emissions from dairy cows by around 10 - 15%, although this depends on the farm's ability to grow maize – challenging in most of Scotland!

Feeding legume silages (such as red clover) has also been shown to reduce methane emissions compared to grass silage, and other forages have shown variable results. As a general rule, increasing forage (and feed) digestibility will reduce methane emissions as a result of altered rumen fermentation, combined with improved animal performance.

The other area that has been looked at is the inclusion of fats (lipids) in ruminant diets, such as extruded linseed or linseed oil. Whilst some results have been promising, the amounts fed (over 6 – 7% DM fat) that result in significant reductions (over 10%) in methane emissions would also reduce feed intakes, rumen function, butterfat and milk yield – all not good news!

2) Feed additives. A large number of different feed additives have been trialed. However only 3-nitrooxypropanol (3-NOP; marketed in the UK under the trade name Bovaer™) has shown consistent results by targeting the enzyme pathways in the rumen that produce methane, with a potential 30% reduction in methane output (depending on feeding rate, and the diet fed). Most studies have shown that 3-NOP has no significant effect on feed intake, milk production or body weight – neither positive or negative.

However, 3-NOP needs to be fed continuously, and so must be fed as part of a TMR, best suited to fully housed cows. There is talk of the development of a continuous-release rumen bolus, but this is not yet on the market.

A number of milk purchasers have ongoing studies feeding 3-NOP on dairy farms, and DEFRA is also looking at how it could be used in the UK.

Numerous other feed additives have been developed and trialed, and so the expectation is that other products will be authorised in future.

3) Improved efficiency. Reducing losses associated with animal disease and poor fertility will reduce methane emissions, when measured as methane produced per litre of milk.

4) Methane emissions from manure. It was considered that methane release from enteric (gut) sources was much higher than those from manure and slurry stores, although a recent UK paper has suggested that methane emissions from manure could be higher than thought. Manure management could therefore help with capturing methane emissions (eg. using biogas).

Whilst feed additives to reduce methane emissions in ruminants will have their place, they are not the magic solution! They will need to be used as part of a holistic view to reduce overall methane emissions from agriculture.

Agriscot 2024

As usual, the DHHPS will be part of the Royal (Dick) School of Veterinary Studies stand at Agriscot on Wednesday 13th November 2024. Come along for a chat if you are going to the show.

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LANTRA - First Aid for Feet Course

We will be running a "First Aid for Feet" practical foot trimming course on Tuesday 17th December at Langhill Farm, Roslin, Midlothian. The course instructors for the day will be DHHPS vet Julie Forrest and Tim Carter a professional hoof trimmer and Chairman of the Cattle Hoof Care Standards Board. To register, contact the DHHPS office

Good dairy stockperson skills

Julie Forrest writes: In my childhood, I was lucky enough to work on the family dairy and sheep farm, where I learned many skills. If I am being honest, I only know where to stand and where not to stand, when to move forward and when to take a step back, and what is the safest way of working due to the many years as a child and young adult out on the farm watching and working with family and staff members moving livestock using best practices. This thought was recently reinforced when I attended a farmer meeting. At this meeting, one farmer was really passionate about farm staff training and development. He said that although he had worked with cattle all his life, he learnt something when an external specialist spoke on best practice for moving cattle and cows' signals at one of his staff training sessions. Good stockperson skills aid low stress handling of animals, and safer, more efficient working.

The Flight Zone and The Pressure Point: Every cow has a flight zone that completely surrounds her, and the size of the flight zone is different for each cow. For example, the flight zone in a dairy cow is approximately 1 - 2 metres, whereas in a beef cow it will be approximately 4 - 5 metres. In addition, the size of the cows' flight zone is not static and can change depending on the handler, levels of stress and the environment of the cow. The edge of the flight zone is known as the pressure point, and is the way that handlers can induce the cow to move. When the cow starts to move, the pressure should be immediately released by the handler (for example by taking a step back or to the side), which then rewards this cow's movement. A zig zag walk helps the cows to judge where we are. Proper manipulation of a cow's pressure zone allows a person to safely and calmly move the cow in the desired direction. Remember a cow will only move in the direction her nose is pointed.

Cows use their 5 senses: taste, smell, hearing, sight, and touch to communicate. Cows have better hearing than humans, and can see 340° around them. Cows have a blind spot, which is directly behind them. A cow cannot see you unless you can see at least one of her eyes.

Points of Balance: The cow's shoulder is one point of balance. If you want to move the cow forward, stand behind her shoulder. If the handler stands in front of her shoulder, the cow will stop. A cow will only back up if a lot of pressure is applied, cows do not like to reverse.

Slow Down! Cows Walk Slower than People

Cows like to walk at 1 ½ to 2 miles per hour, whereas the average human walking pace is 3 miles per hour (about twice as fast as cattle). When a person goes past a cow's point of balance, the cow or cow group will turn around and move in the opposite direction. However, if a person walks towards a group of cows moving in the opposite direction, they will speed up in order to pass the person that is pressuring them. When observing cows walking unassisted, their head is normally down so they can see where they are going to step next. A rushed cow will have her head up and not watch where she is walking, because she is watching for pressure.

Some Key Points to Remember When Moving Cows

- **Keep calm**, assess what is pressuring the cow, and remember a cow will move in the direction her nose is pointed.
- Always let the cow see where you are
- Cattle will look and listen towards whoever is pressuring them
- Cattle walk slower than humans (1½ -2 miles per hour) … so slow down when moving cattle
- The cow's shoulder is one of her points of balance
- Apply pressure and release
- Use of zig-zagging