Non-CO_2 Greenhouse Gases: Methane

Source/Sectors: Agriculture/Enteric Fermentation

Technology: Improving nutrition through strategic supplementation (A.3.1.5)

Description of the Technology:

There are many methods can be used to improve nutrition through strategic supplementation and, consequently, reduce methane emissions. They include:

- Defaunation – One way to manipulate the rumen microbial population is defaunation, in which all protozoa (typically 50% of the total microbial mass in rumen) are eliminated. Defaunating agents such as manoxol, teric, alkanate 3SL3 and sulphosuccinate can reduce methane emission.
- Probiotics – Probiotics are microbial feed additives that contain live cells and a growth medium. These can stimulate milk yield and increase weight gain (Bates, 2001; de Jager *et al.*, 2001).
- Antimethanogen – Certain halogenated compounds such as chloroform, carbon tetrachloride, and methylene chloride can inhibit methane production up to 90%; however, they are not suitable as feed additives yet, because of the associated accumulation of hydrogen and their volatile characteristics (de Jager *et al.*, 2001).
- Molasses/urea blocks – Many nutrients must be present in the diet to support the rumen microbial population; ammonia concentration in rumen is often the primary limitation on efficient digestion. Urea added to the diet has been the most effective method of boosting ammonia levels in the rumen. The molasses/urea block (MUB) is easy to use and methane emission reductions per unit product can be as high as 40% (de Jager *et al.*, 2001).
- Molasses/urea blocks with bypass protein – Animals capable of higher yields and faster growth-rates need a greater supply of amino acids. Providing supplements of molasses/urea blocks (MUBs) with by-pass proteins, which can escape degradation in the rumen and are digested in the lower gut, can greatly increase milk yield and weight-gain of animals on straw/forage (de Jager *et al.*, 2001).
- Targeted mineral/protein supplement – Protein and specific minerals may be deficient seasonally or throughout the year. Supplements targeted to these deficiencies can improve productivity and reduce methane emissions (de Jager *et al.*, 2001).

Effectiveness: Defaunation of the rumen has shown a 30 to 45% decrease in methanogenesis (de Jager *et al.*, 2001). The effects of antimethanogens may not last long.

Implementability: There are concerns of adaptation and toxicity to animal and use of defaunating agents and antimethanogens are scarce, if any**.**

Reliability: Low

Maturity: Fair

Environmental Benefits: Methane emission reduction

Cost Effectiveness: None reported.

Industry Acceptance Level: Low

Limitations: Complete defaunation is difficult to achieve on a large scale. There is a fine line between killing the protozoa and killing the animal. The toxicity of many defaunating agents and antimethanogens restricts their routine use. Applicability and toxicity of antimethanogens are the major concern to animals.

Sources of the information:

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