

## **Manipulation of rumen fermentation and methane gas production by plant secondary metabolites (saponin, tannin and essential oil) – a review of ten-year studies**

### **ABSTRACT**

A wide range of plant secondary metabolites (PSM) have been shown to have the potential to modulate the fermentation process in the rumen. The use of plants and plant extracts as natural feed additives has become an interesting topic not only among nutritionists but also other scientists. Although a large number of phytochemicals (e.g. saponins, tannins and essential oils) have recently been investigated for their methane (CH<sub>4</sub>) reduction potential, there have not yet been major breakthroughs that could be applied in practice. However, the effectiveness of these PSM depends on the source, type and the level of their presence in plant products. The aim of the present review was to assess ruminal CH<sub>4</sub> emission through a comparison of integrating related studies from published papers, which described various levels of different PSM sources being added to ruminant feed. Apart from CH<sub>4</sub>, other related rumen fermentation parameters were also included in this review.

**Keyword:** Rumen; Methane; Fermentation; Plant secondary metabolite