

In vitro Evaluation of the Anti-Methanogenic Properties of Australian Native and Some Exotic Plants with a View of Their Potential Role in Management of Ruminant Livestock Emissions

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Abstract : Samples of 29 Australian wild natives and exotic plants were tested in vitro batch rumen culture system for their methanogenic characteristics and potential usage as feed or antimicrobial to enhance sustainable livestock ruminant production system. The plants were tested for their in vitro rumen fermentation end products properties which include: methane production, total gas pressure, concentrations of total volatile fatty acids, ammonia, and acetate to propionate ratio. All of the plants were produced less methane than the positive control (i.e., oaten chaff) in vitro. Nearly 50 % of plants inhibiting methane by over 50% in comparison to the control. *Eremophila granitica* had the strongest inhibitory effect about 92 % on methane production comparing with oaten chaff. The exotic weed *Arctotheca calendula* (Capeweed) had the highest concentration of volatile fatty acids production as well as the highest in total gas pressure among all plants and the control. Some of the acacia species have the lowest production of total gas pressure. The majority of the plants produced more ammonia than the oaten chaff control. The plant species that produced the most ammonia was *Codonocarpus cotinifolius*, producing over 3 times as much methane as oaten chaff control while the lowest was *Eremophila galeata*. There was strong positive correlation between methane production and total gas production as well as between total gas production and the concentration of VFA produced with $R^2 = 0.74$, $R^2 = 0.84$, respectively. While there was weak positive correlation between methane production and the acetate to propionate ratio as well as between the concentration of VFA produced and methane production with $R^2 = 0.41$, $R^2 = 0.52$, respectively.

Keywords : in vitro Rumen Fermentation, methane, wild Australian native plants, forages

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