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Australian grown sugarcane derived polyphenol has the potential to reduce enteric methane emission from second cross lambs

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The concentration of methane in the atmosphere has increased rapidly since the pre-industrial era, and agriculture is one of the largest contributors to global atmospheric methane pool.[1,2] Australia needs to reduce 50% of its greenhouse gas emissions by 2030 to comply with the Paris agreement.[2] Therefore, strategies including nutritional interventions to mitigate enteric methane emission from ruminants, are urgently required to achieve this goal. This study investigated the methane mitigation potential of sugarcane-based polyphenol (Polygain™, The Product Makers Australia, Keysborough, Australia). The study was approved by The University of Melbourne Animal Ethics Committee. Twenty-four 7–8 months old Poll Dorset × (Merino × Border Leicester) lambs were randomized to three different dietary treatment groups; control ($n = 8$), 0.25% polygain (PG0.25; $n = 8$) and 1% polygain (PG1; $n = 8$). The standard diet of the lambs contained 25% crushed barley grain, 25% crushed wheat grain, 25% oaten chaff and 25% lucerne chaff. The animals were acclimatized to the control diet and feed additive for 15 days prior to the 16-day supplementation and measurement period. Enteric methane emission was measured using a hooded sniffer system (Guardian NG gas card)[3] attached to the feed bins. Body weight (BW) was measured using a walk-over scale on a weekly basis. Daily feed intake was calculated from feed offered and leftover weighing. There was no effect of diet on feed intake ($p = 0.08$). However, there was significant ($p < 0.001$) interaction between diet x day. Body weight was increased by dietary PG in a linear manner ($p = 0.05$). Day ($p < 0.001$) and the interaction between day and dietary treatment ($p < 0.05$) also had significant effect on the BW of the lambs with the addition of polygain. Enteric methane production decreased 49.2% in the PG0.25 group, while the PG1 group produced 33.5% less methane compared to the control group ($p = 0.005$). There was significant ($p = 0.002$) reduction in methane yield (g CH_4/kg DMI) which was reduced by 51.5% and 37.1% in the PG0.25 group and PG1 group, respectively. In conclusion, low dosages of polygain can potentially be used as a feed additive for reducing enteric methane emissions without compromising lamb growth.

References

1. Nisbet EG, Fisher RE, Lowry D, *et al.* (2020) *Rev Geophys* **58** (1), e2019RG000675.
2. Bourne G, Stock A, Steffen W, *et al.* (2018) Australia's rising greenhouse gas emissions. Potts Point: Climate Council. Available from: https://www.climatecouncil.org.au/wp-content/uploads/2018/06/CC_MVSA0143-Briefing-Paper-Australias-Rising-Emissions_V8-FA_Low-Res_Single-Pages3.pdf
3. Garnsworthy PC, Craigon J, Hernandez-Medrano JH, *et al.* (2012) *J Dairy Sci* **95** (6), 3166–3180.