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Inclusion of Several Indonesian Medicinal Plants to *in vitro* Rumen Fermentation and Their Effects on Microbial Population Structure and Fermentation Products

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Abstract

There are thousands of native or naturalised plants in Indonesia that have been used as herbal medicine for centuries. Utilization of medicinal plants to livestock especially in villages has also been practised, but very limited information is available on the effect of these plants on rumen fermentation. The aim of this experiment was to study the effect of addition of four medicinal plants; *Morinda citrifolia* (Mengkudu) fruit, *Nothopanax scutellarium* (Mangkokan) leaves, *Melia azedarach* (Mindi) leaves and *Coleus atropurpureus* (Jawer kotok) leaves, at level of 10% to an elephant grass basal diet, on digestibility, end products of fermentation and microbial population. The experiment was done in an *in vitro* system (Hohenheim gas test) and sampling was done at different hours of incubation. Gas production, ammonia, short chain fatty acid (SCFA), microbial population structure and microbial mass were analysed. There were no differences in total gas and SCFA production and apparent or true digestibility. Inclusion of Mengkudu and Mangkokan gave higher ammonia production whereas Jawer kotok reduced ammonia production compared to the basal although its Nitrogen content was the highest (18.6%). Nitrogen content in the residue was lower in Mengkudu and higher in Jawer kotok than elephant grass which may be due to different crude protein content. Isovalerate production which results from degradation of leucine, was higher for Mengkudu but lower for Jawer kotok, indicating that more protein degradation occurred on Mengkudu than on Jawer kotok. Tannins in Jawer kotok may bind to protein and may, thus, be responsible for lower ammonia production and protein degradation. Bacterial population structure and microbial mass measured by ¹⁵N showed similar results and none of these plants gave higher values compared to elephant grass. The eukaryotes population was very low when Mengkudu and Mangkokan were added which may be due to the presence of saponin.

Keywords: Fermentation end products, *in vitro* fermentation, medicinal plants, microbial population