

Effect of different inclusion levels of oil palm fronds on in vitro rumen fermentation pattern, fatty acid metabolism and apparent biohydrogenation of linoleic and linolenic acid.

ABSTRACT

Effects of different inclusion levels of oil palm fronds (OPF) on rumen fermentation, apparent biohydrogenation of linoleic (C18:2n-6) and linolenic (C18:3n-3) acid and their biohydrogenation intermediates are described after 24 h in vitro incubations with buffer (20 ml), rumen fluid (5 ml) and standard dairy concentrate (0.250, 0.225, 0.200 and 0.175 g). Four inclusion levels of OPF (0, 0.025, 0.050 and 0.075 g) were tested in two in vitro incubation series: without (Experiment 1) and with (Experiment 2) addition of a mixture of sunflower (10 mg) and linseed oil (10 mg) as an external polyunsaturated fatty acid source. Increasing inclusion levels of OPF changed the rumen fermentation pattern in both in vitro incubation series, in terms of a decreased production of short chain fatty acids, a linear increase in acetate and a decrease in propionate proportions. A trend for lower amounts of C18:2n-6 and C18:3n-3 were observed due to a higher apparent biohydrogenation rate of the latter, as the inclusion levels of OPF increased. In order to maximize the valorisation of OPF as a roughage source in Malaysian ruminant production systems, further technological research is needed to improve its digestibility.

Keyword: Biohydrogenation; Fatty acid metabolism; Oil palm fronds; Rumen fermentation.