

TITLE: MICROBIAL COMMUNITY CHANGES IN THE RUMEN FLUID OF SHEEP FED WITH PALM OIL DEODORIZER DISTILLATE (PODD)

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ABSTRACT:

It has been demonstrated that ruminal methanogenic diversity affects host feed efficiency and results in differences in methane production. In this context, the addition of lipids has been shown to influence methane emission in cattle, by essentially decreasing ruminal organic matter fermentation. Palm oil (*Elaeis guineensis*, Jacq) has become the most widely produced vegetable oil on the planet, having a large use in the industry, mainly food industry. In the edible oil, refining encompasses the deodorization process generating the residues called Palm Oil Deodorizer Distillate (PODD) which has a low market price, but with characteristics that possibly make it suitable to be used as animal feed. Thus, the aim of this study was to evaluate the effects of inclusion of Palm Oil Deodorizer Distillate (PODD) on the ruminal microbiota in sheep. Data used were derived from twenty rumen-cannulated sheep fed with five isoproteic and isofiber diets based on elephant grass (*Pennisetum purpureum* Schum. cv. Roxo) silage and supplemented with 0, 25, 50, 75, or 100 g/kg of PODD on DM maintaining a forage-to-concentrate ratio of 50:50 based on DM offered to the sheep at a ratio of 1.5% of body weight (restricted intake). The rumen fluid samples were collected three hours after feeding time directly from the ventral sac of the rumen via cannula then placed in a pre-prepared tube containing buffer to preserve the material and frozen for further analysis. The DNA extracted was used as template for 16S rDNA amplification using the universal primers tagged with barcodes for each diet. Equimolar amounts of the amplicons from each sample were placed into a mixture and submitted to sequencing. Data were processed and analyzed using QIIME and USEARCH softwares. In this study, microbial diversity in ruminal environment is slightly modified when supplemented with PODD up to 10%, leading only to a tiny decrease of diversity index. This lipid supplementary, rich in saturated fatty acid shows good results for ruminants, with benefits that go beyond the energetic increase to the diet, being able also to alter the ruminal microbiota. Assays on the influence of gene activity should be performed in order to better understand the influence of the lipid diet on activity in the microbial and methanogenic community.

Keywords: Biohydrogenation, lipids, small ruminants, rumen microbiome, 16S sequencing.

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