

COMPARATIVE STUDY OF GAS PRODUCTION, DIGESTIBILITY AND METABOLIC ENERGY IN DIFFERENT FEEDS BY *IN VITRO* ANALYSIS WITH FRESH AND LYOPHILIZED RUMEN FLUID

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Abstract

The release of greenhouse gas emissions from ruminants into the atmosphere is a global problem and requires in-depth inquiry. The aim of these research is to compare the produced gas emissions, digestibility and metabolic energy of different feeds by *in vitro* analysis with fresh and lyophilized rumen fluid.

The following feeds were included in the study: spring peas, winter peas, spring vetch, anniversary sainfoin, sorghum - two hybrids, *Sorghum sudanense* and maize. An *in vitro* methodology was used to perform analyzes of feed's with the Ankom RF Gas Production System. Gas production was analyzed at two levels - 24 and 48 hours, and incubation, digestibility, metabolic energy, acid detergent fiber - ADF and neutral detergent fiber - NDF with fresh and lyophilized rumen fluid.

Highest produced quantities of gas at 24 h and 48 h of incubation were found for spring pea's varieties - 196.8 dm/mL and 210.7 dm/mL and hybrid sorghum varieties - 190.7 dm/mL and 227.4 dm/mL respectively. The gas production of technical sorghum and *Sorghum sudanense*, are lower 172 and 178 dm/mL. Sainfoin had the lowest levels of gas production with - 107.7 dm/mL and 152.7 dm/mL. The digestibility of spring peas, spring vetch and winter peas has similar values, ranging from 84.78% to 90.23%. The digestibility of hybrid sorghum varieties is 79.55%, in technical sorghum is 49.19%, and in *Sorghum sudanense* is 60.69%. The data of the metabolic energy obtained using fresh and lyophilized rumen fluid in winter peas and spring peas are very close. In the three groups of analyzed feeds the metabolic energy has almost equal values: 8.74 for hybrid sorghum, 8.55 for technical sorghum and 8.69 for *Sorghum sudanense*.

The comparison between fresh and lyophilized rumen fluid, using in "*in vitro*" analysis of different feeds shows minor variation. Lyophilized inoculum is applicable in "*in vitro*" analysis.

Key words: Gas production, Digestibility, Metabolic energy, Lyophilized, Rumen fluid, Feeds.