

STUDY OF GAS PRODUCTION, DIGESTIBILITY AND METABOLIC ENERGY IN ROUGH AND SUCCULENT FEEDS, WITH FRESH AND LYOPHILIZED RUMEN FLUID

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Abstract

Rough hay and straw, and succulent silage and feeds are essential for feeding ruminants. Their quality depends on the phase of harvesting, technology and method of storage. Digestibility and energy value studies are vital for a balanced diet of ruminants. The aim of the study was to determine the gas production, digestibility and metabolic energy of straw, alfalfa hay and corn silage using *in vitro* methodologies in fresh and lyophilized rumen fluid.

By means of a probe and a vacuum machine we collected inoculum (rumen fluid) from rams 2 - 3 years old from the breed Bulgarian dairy synthetic population (BDSP). An *in vitro* methodology was used to perform analyzes of rough and succulent feed's with the Ankom RF Gas Production System. Digestibility and metabolic energy was evaluated and gas production was analyzed at four levels: 24, 48, 72 and 120 hours of incubation, with fresh and lyophilized rumen fluid.

The obtained results show lower values for digestibility of silage, alfalfa hay and straw in the lyophilized rumen fluid compared to fresh - 68.72%, 62.33%, 29.48% and 64.92%, 58.48%, 26.93% respectively. The values of metabolic energy (ME) in straw are higher in lyophilized inoculum compared to fresh - 5.904 and 5.676 ME, respectively. In alfalfa hay higher values were obtained with fresh rumen fluid 6,813 ME compared to lyophilized 5.637 ME. No differences were found in silage - 5.89 and 5.88 ME. In the case of maize silage, the values are closest in fresh and lyophilized inoculum at 24 hours of incubation - 99.019 and 92.730 dm/mL, respectively. The released gases are lower at the lyophilized rumen fluid by 15.5%, 13.4% and 13% at 48 h, 72 h and 120 h incubation respectively. Gas production in alfalfa hay with lyophilized rumen fluid as well as in corn silage is lower compared to fresh silage. The largest differences were found at 24 hour - 84.41 dm/mL for lyophilisate and 124.67 dm/mL for fresh inoculum. In the wheat straw, gas production at 24 hour is higher in the lyophilized rumen fluid 99.55 dm/mL compared to fresh 88.77 dm/mL. At the following levels, the released gases increase slightly and have close values.

The obtained results in metabolic energy have divergent values for alfalfa hay and straw for different types of rumen fluid. Gas production in alfalfa hay as well as in corn silage with lyophilized rumen fluid is lower compared to fresh, and in straw the results for both types of inoculum are similar, with a slight increase in lyophilized rumen fluid.

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