Rate of ruminal disappearance of whole corn plant with increasing doses of ammonium sulphate

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Introduction Among the minerals, the nitrogen is required in greater quantity by the plant. It is part of proteins, nucleic acids and other important cellular constituents, including membranes and various plant hormones (Fernandes et al., 2010). Due to the advent of no-tillage, it is necessary that there is an adequacy of the fertilization system, since the straw decreases the contact of the cover fertilizer with the soil, causing losses. The supply of N in the form of ammonium is important because it is not susceptible to leaching, guaranteeing the availability of the nitrogen offered (Costa et al., 2011). The losses of nitrogen in the form of sulfate and ammonium nitrate are six times smaller compared to urea (Yamada and Abdalla 2000). In addition to the metabolic functions, nitrogen increases the crude protein levels and the digestibility of this forage (Barros & Calado, 2014). The objective of this work was to verify the relationship of nitrogen doses via nitric and ammoniacal nitrogen on the *in situ* digestibility of maize forage.

Materials and methods The experiment was developed at the Núcleo de Produção Animal (NUPRAN) of the State University Midwest, Guarapuava, PR. The sowing was performed, spacing 0.80 m, 0.04 m depth and 4.8 plants per linear meter, of the hybrid LG 6030 PRO2, early cycle. The base fertilization in the planting groove was 500 $kg.ha^{-1}$ of the NPK formulation 12-31-17, according to soil analysis. The treatments with different doses of ammonium sulphate were applied when the plants reached the V5 phenological stage with the commercial product Yara bela® NPK 27-00-00. The treatments were: 1) 500 $kg.ha^{-1}$; 2) 650 $kg.ha^{-1}$; 3) 835 $kg.ha^{-1}$. The reap was performed of whole plant in phenological stage of hard grain, to 30 cm. Samples of each treatment were dried in forced air oven at 55ºC until constant weight. The dried forage samples were ground to 1mm and the dry matter digestibility (DMS) was determined by *in situ* technique using nylon bags measuring 12x8 cm and with pores 40-60 μm, containing 5g of each material, for incubation in the rumen (Nocek, 1988). The incubation times used were 0, 6, 12, 24 and 48 hours in two steers with 24 months of age, average live weight of 350 kg, with rumen cannula. The experimental design was of randomized blocks, composed of three treatments and four replicates. The results were submitted to analysis of variance and compared using the "Proc Reg" test at the 5% significance level through the statistical program SAS (1993).

Results and discussion The dose in the fertilization of ammonium and nitrate coverage, of 175.5 $kg.ha^{-1}$ of nitrogen, led to a greater in situ degradability of corn forage in the hard grain stage, presenting 0.99% of degradation per hour exposed to the ruminal environment, being higher than 0.92% and 0.88% of the 225.4 $kg.ha^{-1}$ and 135 $kg.ha^{-1}$ respectively (Figure 1).

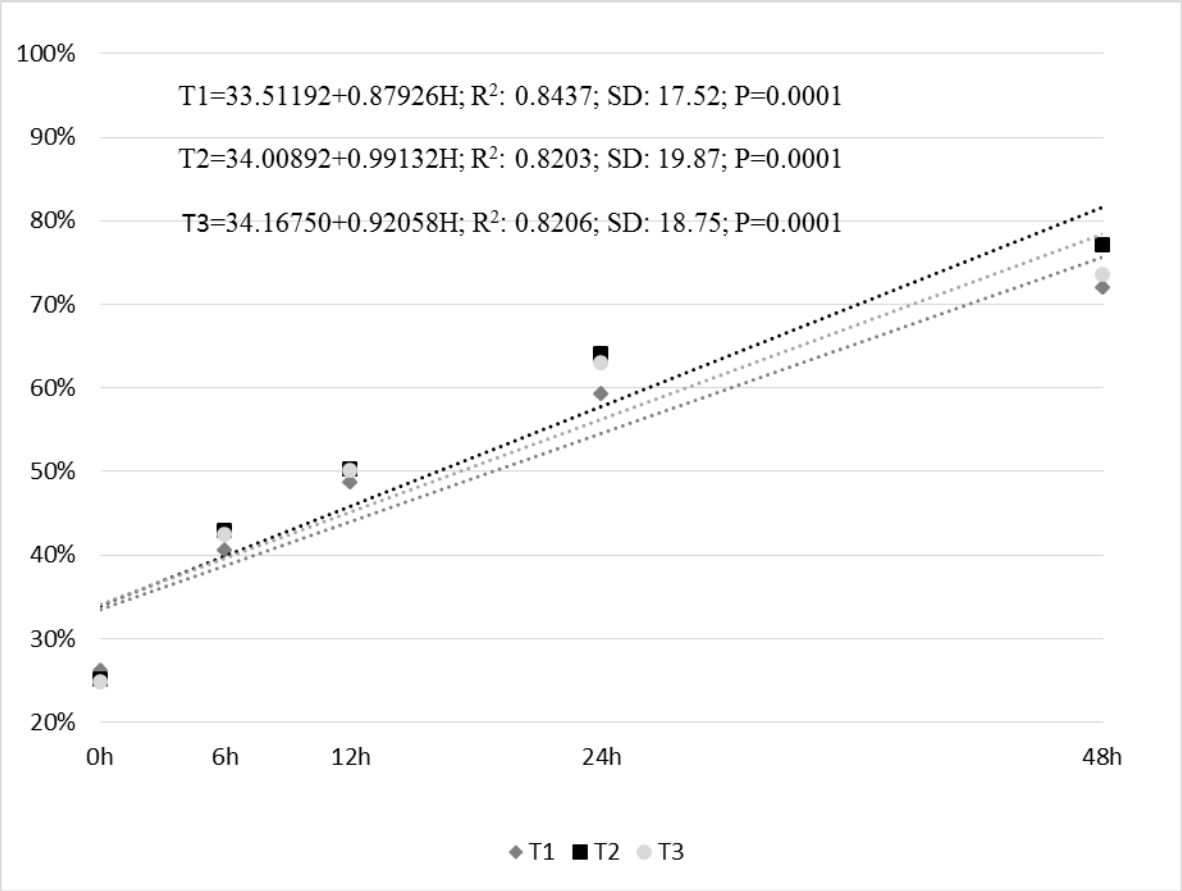

Figure 1 Rumen degradability of corn fodder.

The highest degradability when using 175.5 kg.ha^{-1} of nitrogen can be explained. The increase of nitrogen causes alterations of plant bromatology, with a decrease in the structural fibers. However, high doses of nitrogen alter the physical structure of the plant, where they present a greater participation of stem, bracts and cob, reducing digestibility (Neumann et al. 2017). The availability of nitrogen for a long time, characteristic of the nitrogen in the form of ammonium, brings better utilization by reducing plant stress due to lack of nutrients (Yamada & Abdalla, 2000).

Conclusion The fertilization covered by ammonium sulphate influenced the degradability of the corn plant, where the dose of 650 kg.ha^{-1} was the one with the highest ruminal degradability in 48 hours.