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CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

MATHEMATICAL MODELS ON ESTIMATION OF *IN VITRO* KINETIC PARAMETERS OF *BRACHIARIA* GRASS ASSOCIATED TO GLUCOSE LEVELS

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Gas production technique has been world wide used for evaluating ruminants feeds and diets. However, the interpretation of data obtained from *in vitro* gas production may have a dramatic effect on estimated kinetic parameters, what needs a carefully use of appropriate mathematical models. In this way, this work aimed to evaluate four mathematical models with one and two pools (Schofield; Exponential without lag; Gompertz and Logistic) used to estimate kinetic parameters of digestion of feeds designated to ruminants by *in vitro* gas production technique. In order to obtain different gas production profiles a tropical grass was incubated associated to different (zero, 10, 20 and 30% on dry matter basis) glucose levels. The substrate was incubated in the 120 mL bottles using anaerobic techniques, in which 40 mL of buffer solution and 10 mL of rumen fluid (inoculum) were added. After that, bottles were caped with rubber caps and alumni seals and kept in a water bath during 96 hours at 39ºC under agitation. The gas productions reads were done at 26 time points during the incubation in order to get high quality gas production profile, using a semiautomatic system. Later, the gas production in psi were transformed to mL and used to obtain gas production profiles, which were used to evaluate the nonlinear models. The mathematical models were evaluated by Model Evaluation System – MES, from which we obtained the following criteria evaluation: determination coefficient, coefficient of correlation and concordance, correction bias, mean square of prediction error, mean square of error of prediction, systematic bias and random error. The evaluated models presented different adjustment capabilities to data in function of glucose levels according to variables used to check the accuracy and precision. The unicompartimental models presented good adjustment only when the substrate was the grass, but when we added glucose into the incubation bottles we obtained diauxic gas production profiles, which needed to include the second pool into the mathematical models. Only the Schofield and Logistic models presented good adjustments to gas production profiles for glucose levels, while the Gompertz and Exponential models without lag did not present adjustments to the data. The use of the *in vitro* gas production technique to estimate the kinetics parameters of digestion of feeds used in ruminants nutrition must be look at adequate use of mathematical models according to chemical composition and intrinsic characteristics of feeds being evaluated.

Keywords: digestion rate, feeds evaluation, gas production technique, models evaluation, ruminants.