



Tropentag, September 15-17, 2021, hybrid conference

“Towards shifting paradigms in agriculture
for a healthy and sustainable future”

Ruminal *in vitro* Gas Production Kinetics of Above-Ground Maize Plant and Plant Fractions

ISMAEL RUBIO-CERVANTES¹, CHRISTIAN BÖTTGER¹, KATRIN GERLACH¹, THIAGO BERNARDES²

¹Bonn University, Inst. of Animal Science, Germany

²University of Lavras, Department of Animal Science, Brazil

Abstract

Whole plant (WP) maize is a common feedstuff for ruminant animals in many parts of the world. However, the non-grain parts (NG) of the plant may be of particular interest in animal nutrition because a high overall digestibility of WP is the aim. Moreover, especially in tropical and subtropical regions maize grain is harvested for human consumption and only NG are used as feedstuff. The objective of the present study was to estimate ruminal degradation of maize WP, grain and NG of the plant using *in vitro* gas production (GP) kinetics.

Forty-five maize genotypes were sampled at silage harvest time over two different growing seasons in Brazil, dried at 55°C and ground through a 1-mm screen. For each sample, WP and its grain counterpart were incubated in rumen fluid-buffer solution using the “Hohenheimer Futterwerttest” to determine *in vitro* GP at 0, 2, 4, 8, 12, 16, 24, 36, 48, 72 and 96 h. Gas production of NG of the plant was calculated using the curve subtraction method, that is subtracting the average GP of the grain part (weighted according to its proportional contribution to WP) at each time from the average GP of the WP. Average GP values were fitted to a mono-exponential model to describe GP kinetics.

On average, WP had the highest potential GP at 96 h with 66.1 ml/200 mg dry matter (DM) (standard deviation, SD 4.1), of which grain proportional fraction contributed 31.3 ml/200 mg of WP DM (SD 5.5) and NG contributed 36.0 ml/200 mg of WP DM (SD 5.3). The GP rates (/h) were: WP 0.059 (SD 0.004), grain proportional fraction 0.086 (SD 0.009), NG 0.039 (SD 0.007).

The generally higher GP rate of maize grain compared to NG was likely due to a faster degradation of starch compared to plant fibre. The observed variability in parameters describing GP kinetics was related to actual differences in degradation between varieties, but also the proportion that grain and NG accounted for in WP.

Keywords: Animal nutrition, feedstuff, Brazil, ruminant