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Energy Value and Crude Protein Fractions of Brewery Byproducts for Ruminants – Ethiopian Perspective

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Abstract

Feed scarcity in terms of quantity and quality becomes a substantial issue in most tropical countries, and particularly in Ethiopia where more than two-thirds of the population own livestock. Brewery byproducts cost less than concentrate feeds and, as a supplement, could enhance protein and energy values of low quality cereal crop residues and herbage from pastures. In the current study, 21 samples of brewers grains (BG) and tella-atella (TA) – a byproduct of locally produced tella drink – obtained from Ethiopia were analysed using *in vitro* methods. Samples were subjected to analysis of chemical composition and crude protein (CP) fractionation. An *in vitro* rumen gas production technique was applied to estimate energy values. In BG, substantial contents of neutral detergent fibre (443–738 g/kg dry matter, DM), starch (43–255 g/kg DM), and ether extract (70–120 g/kg DM) contributed to mean estimated values of 8.4 and 6.1 MJ/kg DM for metabolisable energy and net energy for lactation, respectively, with a considerable variability between breweries. Samples of TA exhibited a comparable or higher energy value indicating the potential to be used as a supplement in ruminant feed. Particularly high starch concentrations (220–280 g/kg DM) in TA samples were most likely related to the brewing process and type of grains used. Both BG and TA contained high CP concentrations ranging from 187–299 and 160–219 g/kg DM, respectively. Moderately and slowly degradable CP fractions constitute together a mean proportion of more than three-fourth of CP. High content of cell wall associated CP fractions indicate low rumen protein degradation of BG and TA. These findings underline that, both BG and TA, can be utilised as supplements in ruminant diets and thus contribute to sustainable resource use. However, based on the variability observed in the current study, periodic evaluation of feeding value is vital for efficient utilisation of brewery byproducts from Ethiopian breweries due to inconsistent use of raw ingredients and unmalted cereal grains.

Keywords: Brewers grains, crude protein fractions, ruminant, tella-atella