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***In vitro* Feed Digestibility Using Five Bacteria and their Crude Enzymes Obtained from Cow Rumen**

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Abstract

Access to animal protein is inadequate in developing countries and this could be attributed to poor feed utilisation by animals. A large global supply of meat and milk comes from ruminants several breeds of cattle have been identified in Nigeria. The guts of a cow is a complex system that is responsible for animal's overall nutrition uptake and health because they are loaded with a consortium of microorganisms that allow utilisation of the simplest forms of lignocellulose component of the feed via fermentation for energy generation to drive several metabolic activities. Enzyme technology broadly involves production, isolation, purification and applications, therefore, this study focused on the application of culture of rumen bacterial isolates identified as *Klebsiella edwardsii*, *Photobacterium damsela*, *Pseudomonas aeruginosa*, *Stenotrophomonas matophilia*, *Burkholderia cepacia* and their respective amylase, cellulase, pectinase, protease and lipase with specific activities on 24 h *in vitro* digestibility of cow feed concentrate via gas production technique at 3 h intervals. The test feed was analysed for its composition on dry matter (DM) basis. Rate of feed disappearance was also determined while digestibility characteristics such as metabolisable energy (ME), organic matter digestibility (OMD) and short chain fatty acids (SCFAs) were estimated using the standard methods. The results obtained revealed that of *K. edwardsii* had the highest gas volume (36.0 ml/0.5 g DM) and feed disappearance (98.0 %) while the least gas production was recorded for both *P. aeruginosa* and its crude pectinase (1.0 ml/0.5 g DM). The feed composed of 62.32 % carbohydrate (CHO) with estimated ME (8.02 MJ/kg, OMD (47.81 %) and SCFAs (0.80mmol). *K. edwardsii* and combined crude enzymes in this study showed exceptional ability in feed degradation but the actual digestibility was achieved by the synergistic effect of combined species, thus enhancing tissue accretion for increased supply of meat.

Keywords: Bacterial enzymes, feed digestibility, *in vitro* fermentation, rumen microorganisms, tissue accretion