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"Filling gaps and removing traps
for sustainable resource management"

Bio-Degradation of Water Hyacinth into Value Added Ruminant Feed Using White Rot Fungi

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Abstract

A 40 day experiment was carried out on the biodegradation of water hyacinth (WH) into value added ruminant feed using two white rot fungi (*Pleurotus florida* (PF) and *Pleurotus sajor-caju* (PC)) in a solid state fermentation. The chemical composition and *in vitro* gas production degradability of the substrates were determined.

Results revealed that crude protein (CP) increased significantly ($p < 0.05$) from 11.61 % in untreated WH to 12.86 % and 14.38 % in WH treated with PF and PC respectively. Same trend was observed for ether extract and ash. However, the crude fibre (CF) decreased significantly from 21.23 % in untreated WH to 18.23 % and 15.25 % in WH treated with PF and PC respectively.

The estimated *in vitro* gas production parameters also ranged significantly ($p < 0.05$), except short chain fatty acids (SCFA) that was not significantly different. The fungal treatment enhanced organic matter digestibility (OMD) and metabolisable energy (ME) compared with untreated WH. The OMD increased from 48.50 % in untreated WH to 52.12 % and 53.89 % in WH treated with PF and PC respectively, while the ME ranged from 5.68 % in untreated WH to 7.56 % and 8.39 % in WH treated with PF and PC respectively. Gas production increased significantly ($p < 0.05$) as the hour of incubation progressed. Methane production decreased significantly from 4.00 ml/200 mg DM in untreated WH to 2.50 and 2.00 ml/200 mg DM in WH treated with PF and PC respectively.

This study revealed that fungal treatment of WH enhanced chemical composition and *in vitro* degradability. Hence, biodegradation of WH will fill in the gab for scarcity of feed during the off season and enhance sustainable ruminant production in water hyacinth endemic areas.

Keywords: Biodegradation, *Pleurotus florida*, *Pleurotus sajor-cajor*, ruminant, water hyacinth

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