NUTRITIVE QUALITY OF HYDROPONICALLY PRODUCED FODDER IRRIGATED WITH ORGANIC NUTRIENT SOLUTION AND THEIR SELECTION PREFERENCE BY WEST AFRICAN DWARF RAMS

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ABSTRACT

Forage production for ruminants feeding is constrained by factors such as intrusion of pasture fields, limited land availability, nomadic cattle herding by Fulani and environmental challenges, particularly during dry seasons. Hydroponics fodder production presents consistent supply of nutrient-rich feed and supporting optimal animal performance throughout the year. This study evaluated the nutritive quality of hydroponically produced fodder irrigated with water, cattle manure nutrient solutions (CMNS), and poultry manure nutrient solution (PMNS), and the selection preference of West African dwarf (WAD) rams. Poultry and Cattle faeces were collected and air-dried. One kilogram each of air-dried poultry and cattle manure were mixed continuously in 10 litres of water to dissolve the particles and stored in different tanks. Premier Oba Super 2 hybrid maize, local maize, red sorghum, and white sorghum seeds were purchased and soaked in clean water to allow imbibition. The seeds were planted at a rate of 100 g/tray, evenly spread in labeled trays, and irrigated with different nutrient solutions in the screen house. Growth parameters, dry matter yield, chemical composition, and in vitro gas production were determined after harvesting the fodder 10 days after sowing. An acceptability study was also carried out using Six (6) WAD rams with an average weight of 9.5kg to determine the fodders' consumption value and coefficient of preference. Data collected were analyzed using the General Linear Model (IBM SPSS) and arranged in a factorial arrangement in a completely randomized block design. Hybrid maize fodder irrigated with PMNS had the highest dry matter yield. Hybrid maize fodder irrigated with CMNS (2.60 cm) and PMNS (2.58 cm) solutions produced higher number of leaves. Fodder irrigated with CMNS had the highest (95.75%) dry matter content, while water-irrigated fodder had the lowest (90.20%). Fodder irrigated with PMNS had the highest ($p<0.05$) crude protein content (14.91%), and fodder irrigated with CMNS had lower ether extract levels (6.05%). Ash

content was higher in fodder irrigated with CMNS (5.73%) and PMNS (6.23%). Acid detergent lignin was higher (6.48%) in water-irrigated fodder, and hemicellulose content was highest ($p<0.05$) in fodder irrigated with CMNS (24.44%). Fodder irrigated with CMNS and water showed similarly high dry matter digestibility (76.17% and 76.33%, respectively), while fodder irrigated with PMNS had a lower digestibility value (73.50%). Among the different fodder types, hybrid maize had the highest consumption (181.67 g/day) and the highest coefficient of preference (2.59), while red sorghum (26.67 g/day) and white sorghum (33.33 g/day) recorded the lowest. When fed to WAD rams, fodder irrigated with PMNS (87.50 g/day) and CMNS (81.50 g/day) resulted in higher consumption compared to water-irrigated fodder (65.25 g/day). Hybrid maize fodder was consumed for a longer duration (5.23), indicating it was the most preferred fodder by the animals. Therefore, it can be concluded from this study that hybrid maize fodder irrigated with PMNS had higher growth, improved nutritional quality, higher digestibility, better intake, and coefficients of preference, making it the most suitable choice for WAD rams.