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Sustainable pig nutrition: Evaluating sweetpotato composite meal as an alternative energy source

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Abstract

The escalating cost of conventional feed ingredients such as maize has prompted the search for sustainable, locally available alternatives in monogastric nutrition. This study evaluated the use of sweetpotato composite meal (SCM), a 2:1 blend of sun-dried sweetpotato vines and chipped tubers, as a partial maize replacement in grower pig diets. The research was conducted at the livestock

research station of Michael Okpara University of Agriculture Umudike (MOUAU) in 2022. The objective was to assess its effects on nutrient digestibility, growth performance, and economic efficiency. Sixty crossbred grower pigs (Landrace × Large White) with an average initial weight of 25.4 ± 2.8 kg were randomly assigned to four dietary treatments (T1–T4) in a completely randomised design, with five replicates of three pigs each. The treatments included 0 % (T1, control), 15 % (T2), 30 % (T3), and 45 % (T4) SCM, replacing maize on a metabolisable energy basis. The feeding trial lasted 12 weeks. Growth performance was monitored weekly, and nutrient digestibility was assessed via total fecal collection in the final week. Feed cost per kilogram of weight gain was

used to evaluate economic efficiency. Pigs fed the 15 % SCM diet (T2) achieved the highest final body weight (64.9 ± 1.8 kg) and average daily gain (662 $^{g}/_{day}$), significantly outperforming T4 ($p < 0.05$). The feed conversion ratio (FCR) was most efficient in T2 (2.54), compared to 2.89 in T4. Apparent digestibility of crude protein and dry matter peaked in T2 (89.2 % and 84.6 %, respectively)

and declined with higher SCM inclusion. T2 also recorded the lowest feed cost per kilogram of weight gain (USD 0.446), indicating superior cost-efficiency. These findings suggest that SCM can effectively replace up to 15 % of maize in grower pig diets without compromising growth performance or digestibility, while enhancing economic viability. Higher inclusion levels resulted in diminishing returns, likely due to increased fiber content and potential anti-nutritional factors. The use of SCM represents a promising, sustainable strategy to reduce reliance on maize in swine production. Further studies should explore enzyme supplementation and assess long-term health outcomes.

Keywords: Alternative energy source, digestibility, feed efficiency, food security, pig nutrition, sweetpotato

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