

Performance of starter pigs fed malted and fermented maize based weaner diets

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Abstract

Two experiments were conducted with the overall objective of developing appropriate diets to permit early weaning for increased productivity and profitability of pig production. Use of malted or fermented maize grain in weaner diets is an available alternative towards improved feed intake, digestion and growth rate. Malting significantly increases feed intake in weaned piglets. However, based on cost of inputs, fermented maize-FM based weaner diet was considered to be of low cost, resulted in good performance and therefore used to reduce weaning age. Feeding FM upon weaning at week 5 significantly improved ADG as compared to weaning at week 6. In conclusion, malting and fermentation of maize improve performance of weaned piglets.

Key words: Fermentation, malting, weaners

Résumé

Deux expériences ont été réalisées avec l'objectif global d'élaborer des régimes alimentaires appropriés pour permettre un sevrage précoce en vue d'accroître la productivité et la rentabilité de la production porcine. L'utilisation de grains de maïs fermenté ou malté dans l'alimentation des porcelets sevrés est une alternative utilisable pour l'amélioration de la prise alimentaire, la digestion et le taux de croissance. Le maltage augmente significativement la prise alimentaire chez les porcelets sevrés. Cependant, basée sur le coût des intrants, l'alimentation de porcelets sevrés à base du maïs fermenté (FM) a été considérée comme étant de faible coût, a abouti à une bonne performance et donc a permis de réduire l'âge du sevrage. Nourrir de maïs fermenté (FM) au moment du sevrage à la 5^{ème} semaine a significativement amélioré l'ADG par rapport au sevrage à la 6^{ème} semaine. En conclusion, le maltage et la fermentation du maïs améliorent la performance des porcelets sevrés.

Mots clés: Fermentation, maltage, porcelets sevrés

Background

Weaning is a complex process that includes separating piglets from the sow, exposure to environmental, social and psychological stress, diseases, and most important is switching from the sows' milk to a dry solid feed. Post-weaning period is thus characterised by little or no growth. Malting and fermentation of maize grain are traditional biological alternatives that can be utilised to develop weaner diets that stimulate feed intake and growth rate. This study aimed at evaluating the effect of including malted and fermented maize in weaner diets on nutrient availability, feed intake, growth rate, and its feed cost implications to facilitate development of weaner diets.

Literature Summary

Malting is one of the natural processing methods which can be applied to improve protein digestibility. Malting is a valuable traditional source of enzymes specifically amylase needed to extract soluble sugars from the mobilisation of carbohydrates (Dziedzoave *et al.*, 2010) Malting is important in converting nutritionally poor quality plant protein to higher quality protein for feeding human and monogastric animals. Fermentation is a cereal processing technique practiced widely in Africa and Asia. Cereals including maize, sorghum, rice and millet are fermented using lactic acid bacteria, yeast and fungi to produce a desirable taste, flavor, acidity, texture and above all, improve nutrient digestibility (Nout, 2009). Malting and fermentation are more efficient in phytic acid reduction than the physical methods which include milling, soaking, and heating (Mahgoub and Elhag., 1998).

Study Description

The study was conducted at Makerere University Research Institute Kabanyolo (MUARIK). In experiment 1, a total of 64 weaned large white x landrace starter piglets (initial BW of 6.14 ± 1.3 kg) were fed 1) malted maize-MM, 2) fermented maize-FM, 3) fermented malted maize-FMM and 4) whole maize fermented and or malted for zero days as control (CM). A complete randomised design –CRD consisting of 4 replicates with 4 animals (balanced for sex and weight) per pen was used. Cost of jute sacks, fermentation sacks/gunny bags, labour for sun drying, watering, milling and transport was recorded. In the second experiment two, three piglets from each litter were weaned at 4(W4), 5(W5) and 6(W6) weeks of age and fed on FM until they attained 8 weeks of age. Average daily feed intake (ADFI), average daily gain (ADG) and feed conversion efficiency (FCE) of these piglets were analysed on the 8th week.

Research Application

Malted and fermented based weaner diets improved performance of weaned piglets compared to unprocessed whole

maize (control). Malting significantly increased feed intake in weaned piglets ($P < 0.05$) compared to fermentation. Malted and fermented based weaner diets improved FCE (4.06 and 4.03 respectively) though not significantly ($P > 0.05$) compared to 4.72 and 4.29 due to FMM and CM respectively (Table 1). Based on cost of inputs, fermented maize based weaner diet was considered to be low cost and resulted in good performance.

Based on the data, weaner diets based on malted maize cost more than fermented maize, however, they are appropriate when weaning low weight piglets to stimulate feed intake and weight gain. Fermentation procedures on the other side are cheap, simple, effective and suitable to the local conditions where most pigs are reared in Uganda. Weaner diets based on fermented maize can suitably reduce weaning to 5 weeks compared to 8 weeks used traditionally (Table 2).

Table 1. Showing the effect of malting and fermentation on feed intake, average daily gain and feed conversion efficiency.

	MM	FM	FMM	CM	SE	P-value
ADFI (kg/day)	0.726 ^a	0.642 ^b	0.554 ^c	0.527 ^c	0.023	<.0001
ADG (kg/day)	0.195	0.182	0.193	0.139	0.021	0.3999
FCE (Feed/Gain)	4.06	4.03	4.72	4.29	0.645	0.9043

Table 2. Performance of piglets weaned at different stages when fed fermented maize.

	Week 4	Week 5	Week 6	SE	P-value
ADFI (kg/day)	0.263 ^a	0.189 ^b	0.097 ^c	0.00787600	<.0001
ADG (kg/day)	0.087 ^{ab}	0.094 ^a	0.071 ^c	0.00664978	0.05
FCE (Feed/Gain)	3.106 ^a	2.095 ^b	1.550 ^c	0.17436161	<.001

This implies that pig farmers can wean piglets as early as 5 month with minimum post-wean stress. Early weaning enables sows to return on heat early enough and pig farmers can have more piglets per year. The more the piglets produced per sow per year, the more the profits from pig rearing.

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