



Nutritional value of feed ingredients for pigs in Uganda

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Who this brief is for

This brief highlights findings from observational and experimental studies on pig diets in East Africa. It will help researchers design trials to develop diets for local pigs. It provides information for extension workers on local feeds that are high in energy, fat and protein.

Introduction

In Uganda, smallholder pig farmers report that feeding management is an important production constraint. Feed scarcity, high cost, seasonal variations in feed quality and availability, food competition between people and pigs and lack of knowledge to formulate low-cost nutritionally balanced rations for pigs are key challenges. Low- to no-cost planted forages and opportunistic forages (weeds) and fruits, crop residues and agricultural co-products are available seasonally. These materials could be used in the formulation of balanced rations to meet pigs' nutrient requirements and improve pig growth performance while minimizing feed costs.

Recommendations for intervention and future research

- High-quality unadulterated/genuine milled feeds are needed for pigs to achieve potential growth performance. Research and interventions into processing systems and constraints hindering the ability of feed processors and stockists to provide high quality feed are needed.
- Future studies should sample in all seasons and at all stages of plant maturity.
- Nutrient evaluation of feed samples should also include ensiled plants, tubers and co-products such as blood and rumen contents which are potentially important pig ingredients but are not widely used in Uganda.
- Further analyses should also include toxins and anti-nutritional factors that could restrict the use of local ingredients in pig rations.
- When formulating rations using local feed ingredients for pigs characterized here, consideration of possible nutritional risks including anti-nutritional factors and toxins, extreme nutrient compositions and contamination (e.g. with sand) is recommended.
- The opportunity costs and benefits of using alternative local ingredients, such as labour required to produce and/or collect them, should be evaluated in a cost-benefit analysis.



Inadequately fed smallholder local breed pig, Central Region, Uganda.

Objectives of the project

To summarize the nutritional value of locally available feed ingredients in Central Region, Uganda as a basis for the development of low-cost balanced rations for pigs.

Methodology

Through discussions with farmer focus groups and key informants, 43 different feed ingredients commonly fed to pigs (forages, tree leaves, opportunistic legumes/weeds, fruits, vegetables, home- and commercially-prepared rations, grains and grain co-products) were identified (<http://livestock-fish.wikispaces.com/VCD+Uganda>). In Masaka and Mukono Districts of Central Region, Uganda, 185 samples of the 43 feed ingredients were collected from smallholder pig farms and purchased from feed stores. Nutrient analysis was conducted at Makerere University Agricultural Production Laboratory and complemented by a comprehensive literature review.



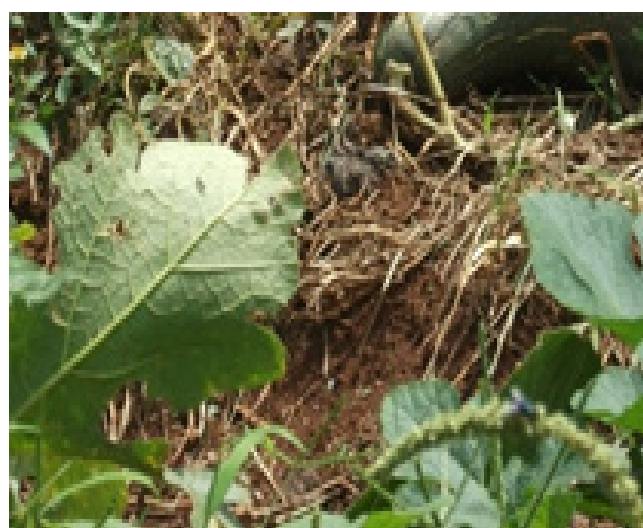
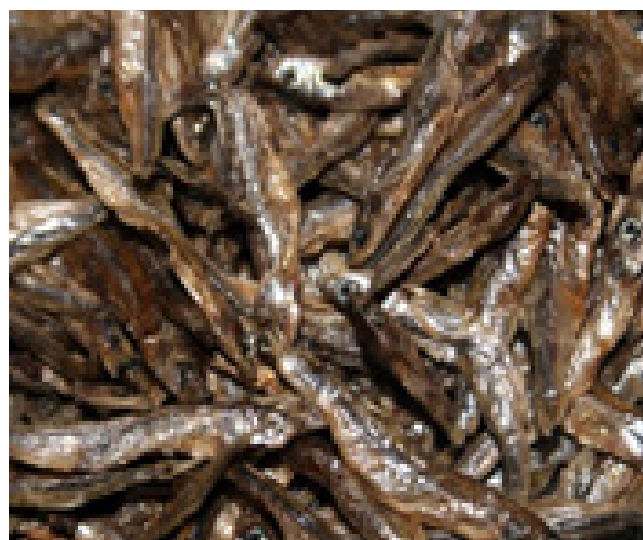
Sweet potato vine, jackfruit, cottonseed meal, maize bran, sun-dried fish (mukene), banana leaf, iodized table salt, and avocado are available feed ingredients for pigs.

Key results

- Local feedstuffs of sufficient nutritional value for pigs are available in Central Region, Uganda.
- Rations for local and crossbreed pigs (8 to 35 kg) should provide 2960 kcal/kg of dry matter and 8.5% crude protein, 0.28% calcium, 0.13% digestible phosphorus and 0.58% digestible lysine (dry matter basis).
- Rations should not contain more than 25% neutral detergent fibre (dry matter basis).

Digestible energy and fat

- Ground sun-dried fish (*Rastrineobola argentea*) had the highest estimated digestible energy.
- Napier/elephant grass (*Pennisetum purpureum*), groundsel (*Senecio discifolius*), red amaranthus (*Amaranthus cruentus* or *dubius*) and commercially-mixed ration had low estimated digestible energy.
- Avocado (*Persea americana*) fruit with peel (seed removed) had the highest fat content.
- Banana peel, red amaranthus and sweet potato tuber (*Ipomoea batatas*) had low fat content.



Sun-dried fish and pumpkin leaf: local available sources of lysine for pigs.

Crude protein and lysine

- The relatively high protein content of glycine (*Neonotonia wightii*), hairy beggar-ticks (*Bidens pilosa*), gallant soldiers (*Galinsoga* spp.), kale/collard greens (*Brassica oleracea* var. *acephala*), and spurge (*Euphorbia heterophylla*) and the estimated digestible lysine content in pumpkin leaf (*Cucurbita moschata*), cocoyam leaf (*Colocasia*), hairy beggar-ticks, amaranthus varieties and spurge indicate that forages are available as good sources of protein and lysine for pigs.
- Ground sun-dried fish, cottonseed meal, sunflower meal and brewer's waste had high crude protein content.
- Ground sun-dried fish and pumpkin leaf had high lysine content.

Fibre

- Forages (e.g. Napier grass, groundsel, banana peel and leaf and *Calliandra calothyrsus*) and co-products (e.g. sunflower meal and maize bran) had high fibre content.
- Ground sun-dried fish and limestone had low fibre content.
- Fibre content (25% of dry matter) of home-mixed pig rations (mixed milled ingredients) was higher than that found in commercial settings in developed countries (10–15% of dry matter).

Ash content was high in purchased feed ingredients

- Individual samples of ground sun-dried fish, commercial ration and cottonseed meal had ash content greater than 25% (Table 1).

- The higher ash content in grains, grain co-products and ground sun-dried fish samples from the current study compared to the literature indicates that contamination or adulteration may be occurring at some point(s) in the feed supply chain.

Table 1: Ash content of ingredients sampled in the current study compared to the literature

Ingredient	Number of samples	Source	Ash % of dry matter
Cottonseed meal	3	Current study	12.8±12.5
	3	Literature ¹⁻³	7.7±1.18
Maize bran	8	Current study	6.8±5.15
	3	Literature ^{1,2}	3.1±2.77
Ground sun-dried fish (<i>Rastrineobola argentea</i>)	3	Current study	58.1±11.1
	9	Literature ⁴	15.9±4.4
Sunflower meal (<i>Helianthus annuus</i>)	3	Current study	10.3±10.44
	3	Literature ¹⁻³	6.9±0.12

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