

Tropical Oilseed Feeds for Poultry

Locally available oilseed feed supplements were evaluated for inclusion in poultry diets. Incorporation of such supplements improves poultry productivity and, thereby, increases smallholders' profitability – it also encourages farmers to cultivate oilseeds. Rations (diet recipes) suitable for small-scale poultry producers were formulated and tested by on-farm feeding trials.

Background

Current trends in per capita income and population growth rates indicate a severe meat deficit in sub-Saharan Africa. As current concerns on the productivity of rangeland increase and as more rangeland is taken up by crop cultivation, greater reliance is likely to be placed on poultry production from high potential zones to meet the shortage in livestock products.

Feed represents between 60% and 70% of the cost of commercial poultry production. Improvements can be achieved most effectively by optimising the use of locally available feed resources and by introducing technologies that reduce the cost of poultry feed. A survey of the needs and constraints of small-scale poultry farmers in the rural areas and small towns of sub-Saharan Africa showed that the birds are generally kept in confinement, and that poultry production is often one of a basket of income-generating activities, each producing a relatively small income.

Natural Resources Institute
University of Greenwich
Chatham, UK
S. Panigrahi

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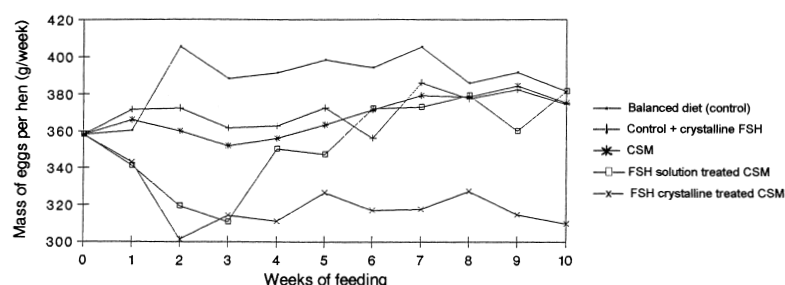
Small-scale oilseed expeller being used in The Gambia.

Research highlights

The nutritive value of a variety of raw materials from tropical countries was evaluated. Many tropical materials contain anti-nutritional factors (cyanide in cassava roots, gossypol in cotton seeds) for which simple methods of detoxification have been developed and tested. Studies showed that coconut cake could be included in poultry diets up to a maximum concentration of 400 g/kg and palm kernel meal up to 500 g/kg. After treatment with a solution of ferrous sulphate to inactivate the gossypol (which causes brown discoloration of egg yolks), cottonseed meal can be incorporated at up to 300 g/kg in layer diets and at higher levels in diets for broiler chicks.

On-farm feeding trials were used to develop the rations and for their transfer to the target groups. Simple 'recipes' appropriate to the circumstances of small-scale poultry producers consisted of a maximum of five local ingredients – such as groundnut cake, millet, rice mill feed, fishmeal, oyster shell – depending on variability, availability and price, and included a premix.

More economic oilseed extraction methods were developed using small-scale oilseed expellers. A prototype oilseed expeller linked to a poultry production unit developed in The Gambia made use of substantial quantities of local oilseeds, resulting in cost savings of 20–25% of those



Treating cottonseed meal (CSM) with ferrous sulphate heptahydrate (FSH) cures discoloration of egg yolks and resulted in return to normal egg production.

incurred using an equivalent amount of feed imported from Senegal.

Uptake

There has been great demand from small-scale producers in rural and peri-urban areas of small towns for the diet recipes based on the use of locally available feeds. Requests for ration formulations have also been made by other countries, for example, from officials in the Local Government Service Commission in Onwerrri, Nigeria, and the Estate Extension Service Trust in Malawi. A number of local small-scale oilseed expellers were installed in Zambia and The Gambia. The co-location of seed storage and oil extraction facilities in the seed production area enabled a reduction in seed storage times – and thus minimised the danger of mycotoxin formation caused by post-harvest fungal contamination. Advice on oilseed cakes produced by a small expeller was given to the NGO Intermediate Technology Development Group (ITDG), Zimbabwe, and advice was also given on the utilisation of groundnut cake produced by a small-scale oilseed expeller in The Gambia. Technical support on the use of oilseed cakes from ram presses in Zimbabwe and Tanzania was provided to the NGO Appropriate Technology International (ATI).

Linkages

Opportunities have been identified for using the poultry feed technology developed by this project to increase

smallholder productivity in a number of mixed-farming systems in sub-Saharan Africa and South Asia. Links exist with a Livestock Production Programme field project in Cameroon (R5179) which aims to demonstrate the use of root crops in poultry diets by testing high dietary rates of inclusion of cassava root meal and sweet potato tuber meal. There are also links with Project R7524 on the use of oilseed cake from small-scale processing operations for peri-urban poultry and small ruminant production in Zimbabwe.

Relevance to sustainable livelihoods

Small-scale oilseed expelling is a natural component of agricultural systems in many African and Asian countries. Assistance given on the installation and operation of small-scale oilseed expellers in a number of countries, including Zambia, The Gambia and Sudan, resulted in the maximum use of local resources. This contributed to improved livelihoods in the smaller farming communities where most farmers have desperately few resources.

Cost savings have been achieved from the trials with a prototype oilseed expeller linked to a poultry production unit developed in The Gambia. Smallholder farmers now take their oilseeds to the expeller operator where they can pay for the processing and take the oil or the cake. Alternatively, the operator purchases

the seed from them and then sells the oil and the oilseed cake. The availability of these options adds to the sustainability of the system and encourages oilseed cultivation by small farmers. The use of oilseed cake in poultry diets improves poultry productivity and profitability, and hence the socio-economic status of low-income farmer families.

Selected project publications

- Panigrahi, S. (1992) Effects of different copra meals and amino acid supplementation on broiler chick growth. *British Poultry Science*, **33**: 683–687.
- Panigrahi, S. (1992) Effects of treating cottonseed meal with a solution of ferrous sulphate on laying hen performance and discolorations in eggs. *Animal Feed Science and Technology*, **38**: 89–103.
- Panigrahi, S. (1995) The potential for small-scale oilseed expelling in conjunction with poultry production in developing countries. *World's Poultry Science Journal*, **50** (July): 1–6.
- Panigrahi, S., Bestwick, L.A., Davis, R.H. and Wood, C.D. (1996) The nutritive value of stackburned yellow maize for livestock: tests *in vitro* and in broiler chicks. *British Journal of Nutrition*, **76**: 97–108.

For further information on the Programme contact:
The Programme Manager
Livestock Production Programme
NR International
Park House, Bradbourne Lane
Aylesford, Kent ME20 6SN
<w.richards@nrnt.co.uk or lpp@nrnt.co.uk
www.nrnternational.co.uk