

## ABSTRACT

This thesis is based on four studies (Paper I, II, III and IV) to investigate Japanese quail (*Coturnix coturnix japonica*) feeding practices in urban and peri-urban areas of Uganda, and their implications for eggshell quality and internal egg quality. Japanese quail feeding practices among quail farmers, including the use of plant leaves were characterized. Nutritional properties of quail diets used were evaluated. The chemical composition, and total oxalate and phytate contents in the plant leaves used, as well as the effectiveness of sun-drying in reducing the total oxalate and phytate contents were determined. Finally, the effects of feeding Japanese quails layer diets containing varying levels of sun-dried cocoyam leaf meal on laying performance, as well as eggshell quality and internal egg quality were evaluated.

The results show that over 90% of the quail farmers used commercially-mixed feeds as opposed to home-mixed feeds. Inappropriate feeding practices existed among farmers, such as the use of the starter diet way beyond the recommended 4 weeks of age (about 13% of farmers). The prevalence of the practice of continuing with the grower diet to the laying stage was at 35%, while nearly 40% offered the layer diet to chicks and growing quails. Of the various plant leaves mentioned in the feeding of quails, cocoyam leaves were the most commonly used. The plant leaves were largely fed to the quails in their fresh forms. The major challenges mentioned were low local demand for quail products (meat and eggs), low consumer awareness, high feed costs, and poor shelf-life of eggs (Paper I). There was a high variation in the nutritional quality of the quail diets used, and the diets did not conform ( $P < 0.05$ ) to the recommended nutrient specifications. The diets were characterized by high ash (17.1-20.2%) and CF (5.5-6.3%) contents. The chemical and energy contents of the quail diets were in the ranges reported for chicken diets in Uganda, which pointed to the use of diets formulated for chickens (Paper II).

All the plant leaves had high CP contents (22.1-31.3%). Overall, total oxalate concentration was highest ( $P < 0.05$ ) in *sukuma wiki* leaves (4.9 g/100g) closely followed by cocoyam leaves (4.0 g/100g), while total phytate concentration was highest ( $P < 0.05$ ) in cocoyam leaves (67.5 mg/100g). Although cocoyam leaves were high in total oxalate and phytate concentrations, much of the concentrations were in the water-soluble form, given that sun-drying reduced these concentrations by up to 71 and 66%, respectively (Paper III). Increasing dietary inclusion level of sun-dried cocoyam leaf meal (from 0 to 5, 10, and then to 15%) led to detrimental effects on laying performance. However, the detrimental effects were counteracted by the improved egg yolk color and eggshell weight (an important trait of eggshell quality), and the optimum dietary inclusion level of sun-dried cocoyam leaf meal was at 4.7% (Paper IV).

In conclusion, quail feeding in urban and peri-urban areas of Uganda is not only characterized by inappropriate feeding practices but also by the use of diets that do not conform to recommended nutrient specifications. The plant leaves used in the feeding of quails contain high CP but also contain high total oxalate and phytate concentrations. Of these, cocoyam leaves are the most promising, since much of their total oxalate and phytate concentrations are in the water-soluble form, and hence were effectively reduced by sun-drying (by up to 71 and 66%, respectively). The inclusion of up to 4.7% of sun-dried cocoyam leaf meal in layer diets improved eggshell weight, pointing to a positive effect on the shelf-life of quail eggs and thus reduced economic losses.