

Incorporation of dried goat rumen contents in layer diets improves egg yolk colour and acceptability of eggs

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Abstract

The use of dried goat rumen content (DGRC) as a partial replacement for fish meal in layer diets was investigated. A total of 90 H&N Brown Nick layer chickens were offered diets in which DGRC were incorporated at 0, 5 and 10 % levels. Iso-caloric and nitrogenous diets were formulated to meet the recommended nutritional requirements for laying hens. Experimental birds were assigned to 9 cages (10 birds/cage) and experimental diets offered in a completely randomized design (CRD) with three replications. Data was collected on egg production, sensory characteristics of the eggs, and a partial budget analysis was undertaken. Diet significantly ($P < 0.05$) affected average daily feed intake (ADFI) and feed conversion ratio (FCR). There was an increase in ADFI and FCR with increasing levels of DGRC in the diets. The results showed that, though there was a gradual decrease in laying percentage with increase of DGRC in the diets, laying percentage did not differ in layers fed on 0 and 5 % DGRC diets ($P > 0.05$). Eggs from layers offered 10 % DGRC were more acceptable than those of layers fed on 0 and 5 % diets. A significant effect ($P < 0.05$) of treatments on yolk colour was observed. Eggs from 10 % DGRC diets had more deep yellow yolks than eggs from 0 and 5 % diets. It was concluded that use of DGRC in layer diets improved yolk colour, acceptability of the eggs and marginal rate of return (MRR).

Keywords: consumer preference, digestibility, egg production, feed conversion ratio, growth

1 Introduction

Inclusion of eggs in people's diets is considered a good way to access animal protein among households (Exler *et al.*, 2013) and also a key pillar in fighting hunger and malnutrition among communities (WHO, 2007). In Uganda, almost all households (HH) practice backyard chicken rearing in order to have access to animal protein or as a source of income to solve immediate domestic problems (Mwesigwa *et al.*, 2020). Commercial egg operations which are key to supplying the population with affordable eggs for nutritional enhancement are constrained by sky rocketing feed costs (Deepika *et al.*, 2018). This not only jeopardizes their efficient operation but also the ability to meet consumers' egg demands. Feed supply to the poultry industry, especially of quality protein sources, is still a daunting challenge

in most developing countries. This is partly due to competition for these high quality protein sources such as fish meal with humans (Anderson *et al.*, 2017). This increases demand for silver fish, an important animal protein source used in livestock feeds (Mwesigwa *et al.*, 2013; Anderson *et al.*, 2017). In Uganda, silver fish is mainly sourced from Lake Victoria and Lake Albert, however, due to its high demand, silver fish meal has been subjected to rampant adulteration, mostly with lake sand (Shahid & Talat, 2005). Use of adulterated silver fish meal in poultry diets not only leads to poor performance of the birds but also to a loss of revenue to both the farmer and the government. Therefore, the complete or partial replacement of fish meal with alternative feed ingredients would be a great relief to the poultry industry (Alagawany *et al.*, 2019). Substantial levels of minerals and relative good crude protein content are found in rumen contents, which are almost freely available in most abat-

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