GIANT AFRICAN SNAILS: A POTENTIAL BROILER FEED COMPONENT IN BARBADOS

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Introduction

The Giant African Snail (GAS) is a non-native pest to Barbados, known to ravage many types of vegetation and cause a general aesthetic nuisance. Currently, many snails are disposed of through the Ministry of Agriculture's bounty system, in which they are purchased from the public at BDS $0.50/lb and then incinerated. Although a pest, the GAS represents a potential resource. Broiler production in Barbados is one of the most important agricultural industries, with chicken accounting for 60% of the protein intake of the local population (Caribbean Poultry Association, 2002). Thus, the objective of this study was to determine if the GAS could be used as a component of broiler chicken feed to aid the poultry industry and contribute to an effective pest management system.

Analysis of the Snail as a Component of Chicken Feed

In order to determine the nutrient composition of the GAS, dried snail meal samples with and without shell were submitted for analysis at Dr. Arif Mustafa's laboratory at McGill University. The meals were analyzed for crude protein, fat, ash, and mineral content (Table 1). While snails with their shells removed could be an excellent protein supplement (71.61% protein) snails with their shell provide

Table 1: Nutritional analysis of GAS with and without shell

	Ash (%)	Fat (%)	Crude protein (%)
GAS with shell	72	0.7	19.32
GAS without shell	10	2.3	71.61

a smaller amount of protein (19.32%) and a better source of minerals such as calcium and phosphorus (not shown), but also contain a lot of ash (72%). High ash content is a restricting factor in terms of the amount of snail meal that can be added to a feed, yet the added step of removing the shell is time-consuming and potentially costly.

For our experiment we used snails with shell. The snails were transformed into a meal by crushing, grinding, cooking and drying, so that they could be incorporated into a basal broiler feed.

Our team collected snails in the gulleys of Barbados.

Trial Design

Feed treatments contained snail meal at 0% (control), 5%, and 10%. A total of 30 broiler chickens (27-d- of age) were received from Chickmont Foods Ltd. and divided into three groups (10/treatment).

The experiment lasted 3 weeks.

The birds were supplied food *ad libitum* and their food supply replenished twice daily with specific amounts of feed. Each bird's consumption rate, growth rate, and feed-to-weight conversion ratios (FCR) were calculated and their carcass weights were determined after slaughter at 47 d-of-age (1 week past the industry norm).

Team members with Dr. Mustafa (McGill University) inspect young birds.

Findings

The local commercial target weight of 2.11 Kg/bird after 40 d-of-age was attained for all treatments and there were no differences in weights for each treatment throughout the experiment (Fig. 1). The cumulative FCR over the entire 3 week feeding trial was the same for all treatments (Fig. 2).

Figure 1. Average weight+/-SE per treatment.

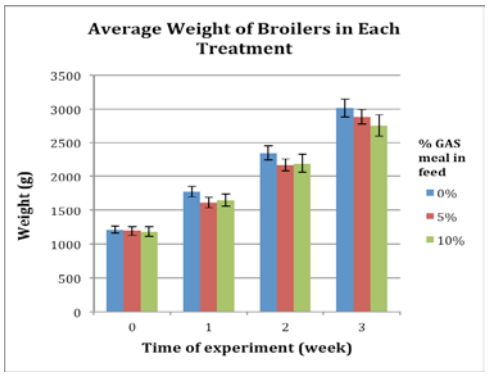
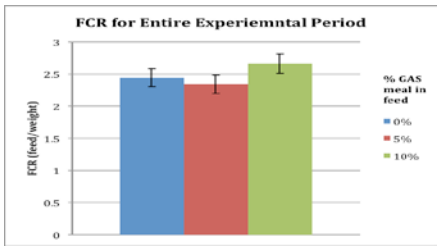


Figure 2. Cumulative FCR mean +/-SE/trial.



In addition, there was no difference in the average weights for each treatment before or after slaughter. The weight of the feathers and offal of the birds were not affected by the GAS meal component. Overall, each treatment was equally good at producing healthy, sizeable chickens under non-industrial conditions.

We recommend that these experiments be repeated with a larger sample size per treatment in a setting closer to industrial standards so that the results will be more readily interpreted for commercial use.

Utilizing the GAS Meal in Barbados

The amount of snails received by the Ministry of Agriculture's bounty system is on the order of 150 tonnes/annum (pers. com Ian Gibbs, 2011) and our results suggest that conversion of some of these snails into a snail meal feed resource is a possibility. The most convenient method for processing the snails would be to incorporate the whole snails with animal offals to be processed at the local rendering plant and incorporated directly into feed. Alternatively, a private entrepreneur could design a process and procure the necessary equipment to start a small business. Further, if a method for removing the

shell was developed, the snail meal would have a higher value due to its high protein content.

Social Attitudes and the GAS

The largest hurdle to overcome in the utilization of snail meal for domestic animal use will be that of public opinion towards the snail. The public believes the GAS to be dangerous, disgusting, and unhealthy. A large-scale education program would go a long way to educate the public about the snail and also about consuming chickens fed on snails. This could benefit local poultry farmers who are heavily influenced by their customer preferences and may not feel that they have a real choice in utilizing this type of feed due to the sensitivity of this vital industry.

The cost benefits of processing the snail in a rendering plant are difficult to determine without further investigation. However, an analysis of GAS meal without the shell, conducted by Robert's Manufacturing, showed it to be worth approximately BDS $2000.00/tonne (compared to BDS $1375.00/tonne for soybean). Theoretically, it could replace the entire soybean meal component of broiler feed. Therefore, if an efficient process to de-shell the snail were to be developed, processing the snails may be profitable.

One of the newly arrived chickens.

One Person's Pest is Another Person's Treasure

GAS meal may eventually be destined for export to other countries rather than for domestic use if it cannot be accepted by local farmers and consumers. The GAS meal (with or without shells) could also be used as a component of pet foods or domestic animal feeds. Processing the snails for human consumption (escargot), which is highly prized in other countries, may be an option as well.

The GAS is a potentially valuable untouched resource with a number of potential uses that could be advantageous from the economic, environmental, and pest-management standpoints. This project has laid a foundation for finding ways to utilize the GAS by illustrating its value (whole snail, including shell) as a quality broiler chicken feed component, replacing up to 10% of commercial feed.

Barbados Interdisciplinary Tropical Studies (BITS) "Team Chicken" left to right Thomas Dashwood, Mr. Keith Laurie (mentor), Anne Reglain, Margot Roux.

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