AN EVALUATION OF VARIOUS FEEDS FOR DOMESTICATED GUINEA FOWL

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ABSTRACT

The high cost of conventional poultry feed limits the viability of broiler production in Namibia. Therefore, a feeding trial, which included the use of Effective Microorganisms (EM), was undertaken to evaluate various options for feeding domesticated guinea fowl chicks. Four groups of six chicks each were provided with different types of feed: (i) Chick grower mash alone; (ii) milled poultry mix alone; (iii) milled maize mixed with 3 % EM fermented maize bran (EM-bokashi), and (iv) the chicks were given free choice of the four types of feed provided to groups i–iii above, except that the milled maize and the EM fermented maize bran (EM-bokashi) were offered separately rather than mixed. The feed intake and mass of chicks were measured over six weeks. The poultry mix group and the milled maize plus 3 % EM-bokashi group consumed less than half the feed that was consumed by the other two groups. EM-bokashi made up 36 % of the diet selected by the free choice group, while poultry mix made up only 3 %. The grower mash group grew the fastest, followed by the free choice group, while the other two groups grew very slowly. The grower mash group converted the feed to body mass most efficiently, at 18,3 %, compared to the least efficient conversion by the poultry mix group, at 8,9 %. However, due to different costs of the feeds, the milled maize plus 3 % EM-bokashi group was the most financially efficient, although the growth rate was too slow for this feed to be a viable option on its own. The free choice group was the next most financially efficient, and had a reasonable growth rate. However, it is doubtful whether farmers would select this more labour-intensive option for raising guinea fowls, as the financial efficiency is only 10 % higher than for the easy-to-feed grower mash group. The 36 % of EM-bokashi selected by the free choice group was considerably higher than the 2–4 % recommended. The assumption that the guinea fowl selected from the free choice options in an attempt to meet their requirements, would further suggest that higher proportions of EM-bokashi could be provided in the diet to reduce feeding costs. However, it is claimed that the main benefits of EM-bokashi lie in better health and odour control, which were not evaluated in this trial. It may be worth investigating the provision of cheap sources of minerals, in addition to supplementation with EM-bokashi made from cheaper types of loose organic matter.

INTRODUCTION

Broiler production that relies on purchased feeds tends to be financially unviable in Namibia, due to the high cost of cereals. Hence, there is a need to try cheaper feeds, or to improve the quality of cheaper materials that could then be used as supplementary feed. Fermentation of bran or husks with Effective Microorganisms (EM), to produce EM-bokashi, offers promise as supplementary feed that may enhance the health and productivity of poultry (Kapongo & Giliomee, 2000; Safalaoh, 2006; Wood & Abuchar, 2002; Zimmermann & Kamukuenjandje, 2008). The EM contains different types of beneficial microorganisms that create the right conditions to support each other and outcompete harmful pathogens, while producing useful substances such as vitamins, enzymes, hormones, amino acids and anti-oxidants that create a reducing environment (Higa, 1996).

A feeding trial, which included the use of EM, was therefore undertaken to evaluate various options for feeding domesticated guinea fowl chicks. For poultry, the proportion of EM-bokashi that is recommended as a dietary supplement, is 2–4 % of the feed intake (EMROSA, 2000; Wood & Abuchar, 2002).

METHODS

The feeding trial was conducted over six weeks in April and May 2008 at Ben-Hur Rural Development Centre in Omaheke Region. The EM derivatives were made according to recipes provided by EMROSA (2004), except that the mother culture of EM was multiplied 20 times instead of 100 times, to ensure a longer shelf life (Pinto, 2004). The EM-bokashi was made by fermenting maize bran with multiplied EM and molasses in air-tight sacks and the moisture content of the final product was approximately 30 %.

Twenty-four domesticated guinea fowl chicks were individually marked and randomly divided into four groups. Each group of six chicks was placed in a coop measuring 4 x 4 m, made by subdividing the poultry house. Each was given a different type of feed, as indicated in Table 1, over six weeks.

Table 1. Types of feed given to each of the groups of guinea fowl chicks in the feeding trial

Name of group	Type of feed provided
Grower mash	Chick grower mash only
Poultry mix	Milled poultry mix only
Maize + EM	Milled maize (97 %) with EM-bokashi (3 %) mixed in
Free choice	Free choice of chick grower mash, milled poultry mix, milled maize, and EM-bokashi

Chick grower mash is a complete balanced feed designed for rapid weight gain and improved immunity. It includes toxin binders, digestive enzymes and sanitisers. Poultry mix, consisting mainly of sorghum, maize and sunflower seeds, was bought as partly crushed grains that were further ground through a fine mill before feeding. Maize was bought as whole grains, which were milled through the same fine mill.

Every morning at 9h00, each group of chicks received 600 g of the allocated feed. The free choice group was offered 600 g of each of the four types of feed. Every afternoon at 16h30 the amount of feed that remained in each coop was weighed to the nearest gram to determine the amount consumed.

The chicks were weighed individually at the start of the trial and at the end of each week. One of the chicks in the grower mash group died after the first week. Therefore its mass was omitted when determining the mean starting mass of 477 ± 60 g (95 % confidence interval).

For each group the weekly feed consumption was determined by adding the daily consumption during the preceding week. The weekly growth rate was determined by subtracting the chick mass at the start of the week from the mass at the end of the week. Normality of data was confirmed by using the Kolmogorov-Smirnov test. The significance of differences among treatments was determined by one-way ANOVA, which was followed up by the Tukey post-*hoc* test to indicate individual treatments between which the differences were significant.

For each group of chicks the efficiency of feed conversion was determined by dividing the chick growth by the dry feed consumed and converting to a percentage. The feed cost of production was determined by dividing the chick growth by the cost of the feed consumed. The inverse of the latter provided a measure of the financial efficiency of the different types of feed.

RESULTS

The feed intake was highest for the free choice group, followed closely by the grower mash group. The difference between these two was significant for the fresh mass, but not when correcting for the moisture content of the bokashi (Figure 1). The amount of feed consumed by the poultry mix group and by the milled maize plus 3 % EM-bokashi group was less than half of that taken in by the other two groups. EM-bokashi made up 36 % of the diet selected by the free choice group, while poultry mix made up only 3 %.

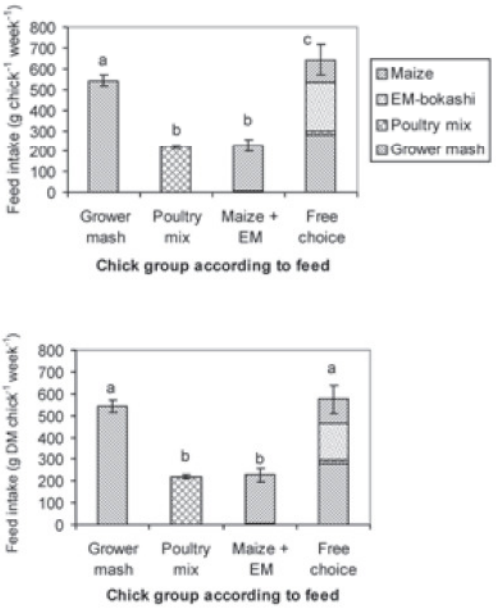

Figure 1. Amount of feed eaten by guinea fowl chicks in each of the four groups. The upper chart indicates the actual amounts of fresh feed consumed, including moisture, while the bottom chart indicates only the dry matter content of the feed. Error bars represent 95 % confidence intervals as a measure of dispersion over the six weeks for the total feed intake. Columns with different letters above them differ significantly ($P < 0{,}01$).

The grower mash group grew the fastest, followed by the free choice group, while the other two groups grew very slowly (Figure 2).

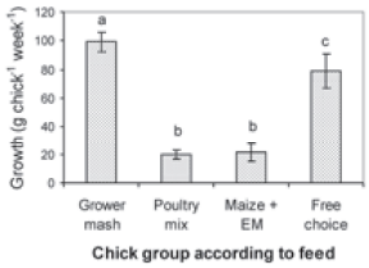

Figure 2. Growth rate of guinea fowl chicks receiving different feed types. Error bars represent 95 % confidence intervals as a measure of dispersion over the five or six chicks. Columns with different letters above them differ significantly ($P < 0{,}001$).

The grower mash group converted the feed to body mass most efficiently, at 18,3 %, compared to the least efficient conversion by the poultry mix group, at 8,9 % (Table 2). However, due to different costs of the feeds, the milled maize plus 3 % EM-bokashi group was the most financially efficient, followed by the free choice group and then the grower mash group (Table 2).

Table 2. Efficiency of feed conversion, feed cost of production and financial efficiency of converting feed to guinea fowl mass, according to feed type

Feed type	Feed conversion (%)	N$ per kg guinea fowl	Grammes of guinea fowl per N$
Grower mash	18,3	22.89	44
Poultry mix	8,9	54.83	18
Maize + EM bokashi	9,5	17.56	57
Free choice	13,7	20.88	48

DISCUSSION

Although the group of chicks that received the milled maize plus 3 % EM-bokashi was the most financially efficient, their growth rate was too slow to be a viable option. It is likely that this diet lacked minerals. Inclusion of labour costs incurred in preparing the feed may cause the financial efficiency of this group to become lower than for the fast growing groups. The free choice group was the next most financially efficient, and had a reasonable growth rate. However, it is doubtful whether farmers would select this more labour-intensive option for raising guinea fowls, as the financial efficiency is only 10 % higher than for the easy-to-feed grower mash group. The poultry mix group performed the worst, with the lowest growth rate, feed conversion efficiency and financial efficiency. The label recommended that the poultry mix should not be given as a sole diet. The poultry mix may simply prove to be a convenient way of attracting free-ranging guinea fowl to safe roosting sites, by scattering a few handfuls in their pens in the evenings.

The 36 % of EM-bokashi selected by the free choice group was considerably higher than the 2–4 % recommended as a feed supplement. Assuming that the guinea fowl selected from the free choice options in an attempt to meet their requirements, this would suggest that higher proportions of EM-bokashi could be provided in the diet to reduce feeding costs. However, it is claimed that the main benefits of EM-bokashi lie in better health and odour control (Wood & Abuchar, 2002), which were not evaluated in this trial. The microbes in the EM may convert carbohydrates into useful vitamins, amino acids and anti-oxidants, but additional sources of minerals need to be available to the birds. Free ranging may allow birds to obtain sufficient minerals from alternative sources such as insects. Free-ranging chickens have been observed to peck at piles of powdered calcrete used for road construction. If the farmer chooses to house guinea fowl full time, it may be worth providing some powdered calcrete (Boitumelo, 2004), which is especially common in Omaheke Region. In addition, the provision of green leaves from cheap sources, such as weeds, may be beneficial for the birds, while insects could be attracted to the poultry house through various means (Mollison, 2008).

The poultry mix and maize were milled at the start of the trial and the milled feed lasted almost until the end, when new grains and seeds were milled. Daily milling of uncracked seeds and grains just before feeding would ensure a fresher feed with higher nutritive value (Beddoe, 2002).

CONCLUSION

None of the alternative feeding options tested in this trial turned out to be superior to grower mash. However, the higher financial efficiencies of the groups that received EM-bokashi suggest that cheaper alternatives may be effective, if supported by sufficient minerals. Further trials with EM-bokashi may be warranted, if cheap sources of minerals are made available. In addition, cheaper materials than maize bran, such as millet husks and malt dust, could be used for production of EM-bokashi.

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