

Potential Nutritive Locally Available Feed Ingredients Used For Tilapia Farming In Tanzania

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Background

Aquaculture (Fish farming) is the world's fastest growing and most diverse food production sector, contributing around 17% of the human total animal proteins consumption, and 7% of all proteins consumed globally. The venture is continuous increasing globally up to 82.1MT, accounted for 46% of the total global fish production in 2018 (FAO, 2020), but it has been become popular in Tanzania in the recent years, resulting in an increased in number of fishponds. This has caused a corresponding demand for good-quality fish feeds at affordable prices, for sustainable aquaculture production and productivity. However, the cost of both local-made and imported commercial fish feeds available in the country and across East Africa region is very high and it is un-affordable by fish farmers. Currently, market price of commercial fish feeds ranged from US dollar 1.1-2.16 per Kg. The high price of these commercial feeds available in East African region particularly in Tanzania and across the continent probably due to use of expensive ingredients fishmeal as their primary protein feed ingredient, in which its availability is not sustainable due over-fishing and competition with other animals. Therefore, the present study investigated the potential nutritive non-conventional locally available low cost ingredients fed to tilapia, the most commonly farmed fish species in Tanzania.

Method

Several consecutive studies were conducted from 2016 to 2019 in Tanzania in our efforts to address the issue of availability of affordable good quality fish feeds. Potential local feed ingredients such as fresh water shrimps (Uduvi), fish frames (Nile perch skeletal remains post filleting) and brewery-spent yeast were identified through a field survey, and their chemical composition was analysed according to AOAC (1990) method. The nutritive potential of these identified locally available ingredients as an alternative to fishmeal were investigated through digestibility studies in Nile tilapia (*Oreochromis niloticus*), while their effects on growth performance and carcass traits were studied in Nile tilapia fed with either fishmeal based diet or diets in which fishmeal protein replaced with 50% of identified local ingredients. The feed costs of replacing fishmeal with these alternative ingredients for tilapia were also determined.

Results

According to the analysis results, 80% of tilapia fish farmers surveyed (n=202) in nine administrative regions found in both mainland Tanzania and Zanzibar island relied on locally available ingredients to supplement tilapia diets; of which 3% accounted for fresh water shrimp, while yeast and fish frames were not yet used as potential ingredients in Tanzania. According to chemical composition of these local feed ingredients showed that ash, crude protein, and crude lipid for fresh water were 58.8, 28.0 and 9.6 % DM; 47.0, 35.8 and 15.3% DM of fish frames; and 3.5, 35 and 0.5% DM for yeast, respectively. Fresh water shrimps contained high level of lysine (63 g kg⁻¹ DM), Methionine + Cysteine (20 g kg⁻¹ DM), and tryptophan (6 g kg⁻¹ DM) compared to fishmeal. Moreover, fresh water shrimp contained good mineral content profile compared to fishmeal. According to the digestibility studies, fresh water shrimp was the most digestible ingredients compared to the other tested diets (blood, marine shrimp, fish frames, brewery-spent yeast, duckweed and moringa leaf). Moreover, growth performance, feed intake and protein efficiency value of juvenile (male) Nile tilapia were slightly lower with a fishmeal diet compared to other test diets where fishmeal protein was replaced (50% on dry matter (DM) basis) with cattle blood meal, fish frames meal, freshwater shrimp meal or brewery spent yeast meal. Cost analyses for producing tilapia of standard Tanzanian market size (250 g) showed that 50% replacement of fishmeal (DM basis) with the selected test ingredients could reduce feed costs by 33%.

Conclusion

In conclusion, the profitability of small-scale tilapia production in Tanzania can be improved by introduction of brewery-spent yeast (yeast), fish frames (Mapank) and fresh water shrimp (Uvuvi) as a fishmeal alternatives in fish diets.