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Research Application Summary

Development of least cost formulated feed for *Tilapia rendalli* in tank based grow- out culture system

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Abstract

An experiment was conducted at Bunda fish farm from November 2009 to February 2010. Juveniles of *Tillapia rendalli* of average weight 9.5 ± SD 0.5g were stocked in outdoor concrete tanks and fed on diets of different plant protein sources formulated at different crude protein (CP) levels. The results indicated that fish treatments had significant effect on growth and survival. Fish fed on Diet 1 had an average final weight 25.64±0.79g, Diet 2 had final average weight of 23.31±0.71g, Diet 3 had final average weight of 21.71 ±0.80g and Diet 4 had an average final weight of 23.00±1.12g and differed significantly among treatments. Survival of the fish was highest in Treatments 2 and 3 which were 85.5% and 85.6%, respectively. Treatments 1 and 4 had low survival rates of 77.8 and 60%, respectively. This study established a potential of using a combination of local plant protein sources which was relatively cheap, readily available and easily accessible to make least cost feed for tilapia species in tank based grow out system.

Key words: Feed formulation, fish, plant protein

Résumé

Une expérience a été menée à la ferme de poissons à Bunda de novembre 2009 à février 2010. Les *Tillapia rendalli* juvéniles du poids moyen de 9,5 ± 0,5 g SD ont été stockés dans des réservoirs en béton en plein air et nourris avec des régimes alimentaires des différentes sources de protéines végétales en protéines brutes formulées dans différents niveaux (CP). Les résultats indiquent que les traitements de poisson ont un effet significatif sur la croissance et la survie. Les poissons nourris avec l'alimentation 1 a un poids moyen final de 25,64 ± 0.79g, L'alimentation 2 a le poids moyen final de 23,31 ± 0.71g, L'alimentation 3 avait le poids moyen final de 21,71 ± 0.80g et l'alimentation 4 avait un poids moyen final de 23,00 ± 1,12 g et variés significativement entre les traitements. La survie des poissons est la plus élevée dans les traitements 2 et 3 qui ont été respectivement de 85,5% et de 85,6%, Les traitements 1 et 4 ont un faible taux de survie de 77,8 et 60%,

respectivement. Cette étude a établi un potentiel d'utilisation d'une combinaison de sources locales de protéines végétales qui a été relativement peu coûteux, facilement disponible et accessible à moins d'aliments pour les coûts et les espèces de tilapia dans le réservoir à base de système de reproduction.

Mots clés: La formulation des aliments, le poisson, des protéines végétales

Literature Summary

Formulated feed has many known advantages which include, enhancement of high stocking density especially in polyculture system resulting in high yield, promotion of growth which enables the farmer to observe the behavior of fish during feeding in order to detect any abnormality (Gabriel *et al.*, 2000; Gabriel and Keremah, 2003). Unlike in the past, when fish depended on natural food in the pond, the production of fish feed is becoming popular with each passing day in the fish farming countries (Gabriel *et al.*, 2007). This study aimed at formulating diets involving least cost combination using ingredients from plant sources and investigated their effects on growth performance and feed utilization of *T. rendalli* in tank based grow-out culture system.

Study Description

The study was conducted at Bunda student's fish farm. This area was chosen because it had all the necessary facilities, such as concrete tanks, holding tanks and a dam that supplied water throughout the year. *Tilapia rendalli* fingerlings of 10g average body weight and average length 55.3mm were obtained from Bunda student's fish farm and stocked at 5fish per m^2 in $6m^2$ concrete tanks, thus 30 fish were stocked per tank. The experiment was conducted for 84 days using the completely randomized design. Four different diet combinations were formulated varying in the protein source and the crude protein percentages. Diet 1 had a combination of sunflower seed cake and cotton seed cake at 28% CP; Diet 2 had a combination of cotton seed cake and groundnut cake at 30% CP; Diet 3 composed of sunflower seed cake and groundnut seed cake at 32% CP; and Diet 4 was composed of cotton seed cake and soybean meal. These feed formulations were assigned to the tanks at random. The fish were fed at 5% body weight throughout the experiment period. The diets varied in crude protein because the study aimed at formulating a variety of least cost feed that fitted the recommended protein range of crude protein for tilapia diets, so that if these diets were to be

adopted, the farmer could formulate feed according to the ingredients available.

Research Application

Profitable fish culture requires a continuous supply of formulated fish feed in which proteins serve as both growth nutrient and energy currency. Thus, formulation of low cost feeds using the cheapest sources of proteins is essential to achieving fish production and to reduce feed cost. Plant protein based diets made from locally available and low cost plant based ingredients formulated using least cost combinations fed to *T.rendalli* in tank based grow-out culture system improved growth of *T. rendalli* evident by the good percentage increase in weight, acceptable feed utilization indices (PER and FCR).

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References

Gabriel, U.U, Inko Tariah, M.B., Keremah, R.I. and Davies O.A. 2007. The role of dietary phytase in formulation of least cost and less polluting fish feed for sustainable aquaculture development in Nigeria. *African Journal of Agricultural Research* 2(7):279-286.

Gabriel, U.U. and Keremah, R.I. 2003. Effects of varying dietary protein: energy on carcass composition, feed conversion efficiency and condition of *Hetero branchus bidorsalis* fingerling. *Journal of Zoology* 2(2):19-29.

Gabriel, U.U., Inko, Tariah, M.B., Allison, M.E. and Davies, O.A. 2000. Growth of Hetero *Branchus bidorsalis* fingerlings fed varying dietary protein and energy rations. *Journal of Agriculture Biotechnology and Enviroment* 2(12):35-41.