

SUMMARY

The objectives of this study are *first*, to evaluate the ability of juvenile tilapia nilotica to utilize different levels of corn (as source of carbohydrate) in terms of growth performance feed efficiency, protein utilization indices, blood glucose, activity of some liver enzymes, body composition and histopathological changes in tissues of liver, kidneys and spleen. *Second* to study the effects of dietary corn level on apparent digestibility coefficients of dry matter, crude protein and lipid in the experimental diets. This study was conducted in two separate experiments:

The first experiment (growth trial)

This experiment was carried out to study the effects including different levels of yellow corn (as source of carbohydrate) in diets for Nile tilapia niloticus. One hundred eighty Tilapia nilotica (*Oreochromis niloticus*) fingerlings (average initial body weight, 7.74 g) were divided into six duplicates groups (each with 15 fish) in glass aquaria. Six isocaloric (3000 Kcal DE / kg of diet) and isonitrogenous (32 % CP) diets were formulated to contain different levels of corn (20, 25, 30, 35, 40 and 45 %) as the main source of carbohydrate. Diets were pelleted into a suitable size (1.5-mm diameter) using a pelting machine and fed to fish (for 14 weeks) as a percent of body weight. Fish were weighed every two weeks intervals and growth performance and protein utilization indices were calculated. Blood samples were taken to measure glucose level and activity of some liver enzymes. Samples of whole fish were analyzed for moisture,

crude protein, lipid and ash. Specimen of liver, kidneys and spleen were prepared for histopathological examination.

Results of the growth trial can be summarized as follows:

- Corn level had a significant ($P < 0.05$) effect on body weight development throughout the growth trial. Fish fed diet contained 45% corn recorded the highest value (35.48 g), while the lowest value of body weight (29.25) was recorded for the group fed the diet contained 20% corn.
- Corn level had a significant effect on average feed intake and feed conversion values. Fish fed diets contained higher levels of corn have always higher feed intake and better values of feed conversion. At end of the growth trial the values of feed intake (g/fish) and feed conversion were 58.76, 2.74; 61.13, 2.58; 65.03, 2.57; 67.07, 2.56; 68.4, 2.57 and 68.74, 2.48 for the groups fed diets contained 20, 25, 30, 35, 40 and 45% corn, respectively.
- Protein retention, protein efficiency ratio and apparent net protein utilization values were significantly affected by the corn level in the diet. The values were 33.33, 1.13, 176.79; 41.31, 1.21, 210.63; 47.57, 1.2, 227.07; 59.32, 1.21, 274; 64.26, 1.20, 291.38 and 70.6, 1.25, 318.05 for the groups fed diets contained 20, 25, 30, 35, 40 and 45% corn, respectively.
- Blood glucose level was significantly higher in fish fed diet contained 45% corn as compared to other treatments. Activities of aspartate amino transferase and alanine amino transferase were significantly increased as corn level in the diet increased.

- Corn level in the diet has significant effect on whole body composition of the fish slaughtered at end of the growth trial. The crude protein and fat % of the body were significantly higher in fish fed diets contained 35, 40 or 45% corn (61.25, 18.99; 62.56, 20.05; and 62.1, 25.38%, respectively) when compared to fish fed diets contained 20 or 25% corn (55.1, 12.84 and 56, 14.61%, respectively) while fish fed diets contained 30% corn had intermediate values (58.63, 16.98%). The level of corn in the diet did not affect the moisture or ash content of fish carcasses.
- The health conditions of fish were apparently normal and fish were able to respond positively to all test reflexes. Macropathological examination did not reveal any pathological differences in fish fed the dietary treatments. Histopathological examination revealed that the degree of fatty infiltration in the liver was correlated to the level of dietary corn in the diet. Some fatty changes were detected in livers of fish fed diet contained more than 35% corn. Glycogen content of the liver has generally been observed to increase with increasing dietary corn level.

The second experiment (digestibility trial)

After the growth trial, fish remained were kept to measure the digestibility coefficients of the experimental diets. Initially, fish were fed ad libitum for one week to acclimate to them to the diets, system and free their guts from any previously ingested food. They were fed for two successive weeks to collect sufficient fecal matter for analysis. Feed was given daily at 12.00 h at rate of 2 % of body weight. The fish were allowed to feed for one hour, after which any

feed remnants were removed out of aquaria by siphoning. Fecal matter was collected by slow siphoning over a fine mesh with a narrow plastic tube for each replicate. Care was taken to avoid breaking the thin fecal strings in order to minimize nutrient leaching.

Results of the digestibility trial can be summarized as Follows

- Apparent digestibility coefficients of dry matter were significantly increased by increasing the corn level in the diet. The values were 40.3, 45.19, 46.84, 49.92, 54.12 and 54.39 %, for the diets contained 20, 25, 30, 35, 40 and 45% corn respectively.
- The dietary treatments had significant effects on apparent digestibility coefficients of crude protein and lipid. The values were 66.07, 83.66; 71.87, 84.97; 75.55, 86.04; 78, 87.35; 84.5, 88.25 and 81.85, 89.49% for the diets contained 20, 25, 30, 35, 40 and 45% corn respectively.

From the results of the study it could be concluded that Nile tilapia fingerlings (*Oreochromis niloticus*) could efficiently use higher levels of corn, as source of energy, in their diets without detrimental effects on growth performance, health condition, body composition or nutrient digestibility of the diet.

CONCLUSION

Based on the results of this study it could be concluded that Nile tilapia, *Oreochromis niloticus* fingerlings could efficiently utilize corn as a source of energy. Under conditions of this study, the obtained data provide a clear evidence that inclusion of corn up to 45% in diets of Nile tilapia fingerlings has improved growth performance, protein utilization indices and nutrient digestibility without any detrimental effects on health conditions. Some degenerative changes in tissues of liver and kidneys were associated with high level of corn in the diet above 35%.