the use of fish meal replacers in fresh water aquafecds

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Three experiments were designed to evaluate three alternative protein sources as fish meal (FM) replacers in Nile tilapia diets, during fry, fingerlings and grow-out stages.The first feeding trial was carried out for 0. niloticus fry in glass aquaria, where as the second and third feeding trial (for fingerlings and grow-out stages) were conducted in cement ponds at the El-Kanater El-Khairya Experimental Fish Farm (NIOF).Three fish meal replacers; fermented fish silage (FFS), boiled soybean meal (BSM) and mixture of both FFS and BSM, 1:1 (MIX) were tested for tilapia diets and also economically evaluated.The average values of percentage weight gain, daily weight gain, specific growth rate, feed conversion ratio, protein efficiency ratio, condition factor were measured. In addition, protein retention, fat retention, energy retention and some biological parameters such as hepatosomatic, gonadosomatic, and filling indices, were also estimated.In addition to muscle composition and liver metabolites (liver protein, lipid and glycogen) for the test fish groups fed the three FM replacers, were determined. The obtained results indicated the superiority of fish performance for fish groups 2 and 3, whose feed diets contained 25-50% of the tested FM replacers.However, further replacement of more than 50% of FM with the tested replacers caused a remarkable DROP in growth and poor nutritional properties.The nutritional experiments were conducted as follows:Experiment I : Partial and complete replacement of fish meal by fermented fish silage (FFS).Five diets were formulated to contain 0% (control), 25, 50, 75 and 100% FFS. The inclusion of FFS protein level was non significant expense of FM protein diet (control).The grovvth response of O. niloticus stages varied according to the percentage of FFS inclusion level in the diet.Fish fed 100% FFS exhibited the significant poorest growth performance and nutritional status among all and as compared with those for fish fed FM-based diet.Increasing the level of replacement FM by FFS up to over 50% caused a significant reduction in total hepatic protein, body composition and biological indices.A negative correlation coefficient between (PER or daily weight gain) and FCR.The cost per kg decreased by increasing the level of replacing FM by FFS. The incidence cost increased and the profit index decreased by iricreasing the level of FFS replacement.Fish fed experimental diets containing 25 or 50% FFS showed highest muscle protein, liver glycogen and lowest total lipids in the two tissues. No significant effect compared with control diets.Experiment II: Partial or complete replacement of FM by boiled soybean meal (BSM).Similarly, five diets were formulated, where the protein level of the test diets

0, 25, 50, 75 and 100% levels of BSM were non significantly different from that of CTR the diets.The best growth performance as well as nutritional parameters were recorded for fish fed the diets containing maximum 50% soybean without significant different compared with the control group fish (diet 1, 100% FM). The lowest values were recorded for fish fed diets containing 75-100% BSM, with highly significant differences compared with that of control.Inclusion levels exceeding 50% FFS adverting affect fish growth and feed utilization efficiency.No significant differences in total protein, glycogen and lipids in liver and flesh fed up to 50% BSM compared with control one.The incidence cost was significantly increased for fish fed the diet incorporating 100% BSM than those for fish fed to test diets containing 25% BSM.The best profit index was recorded for fish fed the diets.containing up to 50% BSM with significant difference when compared with control diet.Experiment III: Partial or complete substitution of FM by a mixture of both substances (FFS+BSM, 1:1 W/W).Like wise five diets were formulated to 25%, 50%, 75% and 100% of MIX were used.By the end of the experiment (18 weeks) fish fed the diets where 25-50% of FM were replaced by MIX, showed the best body weight, and SGR as compared with those obtained by fish fed the 100% FM. No. significant differences were found in survival rates, FCR or PER.Various results were noticed among the nutritional parameters measured in apparent net protein utilization of fish fed the various diets. Fish fed a diet containing 100% MIX had highest significantly carcass fat and lowest protein percent for liver and flesh. On the other hand, fish fed a diet containing 25% MIX obtained the lowest lipids and the highest total proteins.No. significant differences in gastrosomatic indices for fish fed the various test diets, also no significant effect for fish fed 50% MIX compared with control in hepatosomatic, gonadosomatic and filling indices.The cost per kg feed decreased significantly by increasing the FM replacer in diets. The lowest incidence cost was observed for fish fed the lowest incorporation level (25% MIX). The best profit index was obtained by fish fed the diets containing 25-50% level of MIX.The present investigations revealed that; for aquaculture development to get best growth rates and highly total production for Nile tilapia (0. niloticus) fry, fingerlings or grow-out stages it is suggested to feed the fish with FFS, BSM or MIX at a ratio not more than 50% that can be incorporated safely and economically in diets.