NILE TILAPIA PROTEASES SENSIBILITY TO PROTEASE INHIBITORS IN AQUAFEEDS


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Protease inhibitors presence in aquafeeds have metabolic negative effects and decreased amino acids digestibility. Thus the aim of the present work was to investigate the presence of proteases inhibitors in aquafeeds using purified fish proteases. For protease purification, visceral of Nile tilapia (Oreochromis niloticus) was homogenized by heat treatment, ammonium sulfate precipitation and affinity chromatography. Nile tilapia proteases were immobilized in magnetic chitosan, and the effects of pH, temperature, reuse, and storage time were evaluated to establish the best conditions of operation. Seven different aquafeeds were incubated with the immobilized proteases. A partially purified trypsin with apparent molecular weight of ~23kDa was employed as a control. The best operation of immobilized protease occurs at 50°C (1.101 ± 0.0371 μg/mg) and pH 8.0 (0.5503 ± 0.0107 μg/mg) of residual activity, using BApNA as substrate. With respect to storage time, immobilized proteases remain viable after 90 days in 4°C store. Differences of up to 80% were found in the catalytic activities between purified and commercial proteases against possible protease inhibitors present in the studied diets. Fish immobilized proteases showed residual activity of 57% (Diet 1), 70% (Diet 2), 72% (Diet 3), 42% (Diet 4), 48% (Diet 5), 100% (Diet 6) and 71% (Diet 7) compared to the commercial enzyme activity. This work shows that the use of commercial enzymes may not accurately reflect the way the fish digest the nutrients in aquafeeds. This feature acquires high importance in two instances: there are serious economic problems associated with inappropriate use of aquafeeds offered to aquatic organisms, and this factor deserves an argument about as the formulation of animal diets can affect the animal growth and consequently fish production as food source.

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