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The Use of Enriched 15N as an Indicator of the Assimilation of Fish Meal, Pea Seed Meal and Housefly Maggot Meal Protein in the Diet of *Oreochromis niloticus*

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Abstract

For effective substitution of fish meal in new aquafeeds a complete evaluation of possible alternative feed ingredients should provide exact data related to their nutritional value, as well as digestibility of the main nutrients. Considering new methods in fish digestion studies we examined the potential of using an enriched stable isotope (^{15}N) to evaluate the digestibility and trace the assimilation of different dietary protein sources in the digestive tract of male *Oreochromis niloticus* (49.9g ± 25.2g).

Fish meal and housefly maggot meal were used as sources of animal protein and pea seed meal as a source of plant protein. All three protein sources were labelled with ^{15}N before they were incorporated into three standard compound isonitrogenous flake diets (crude protein: 30.2 % ± 0.3 in dry matter). 40 experimental fish divided into four groups of ten individuals were all fed with one of the experimental diets at the same starting time. After 15 minutes, 2 hours, 4 hours, and 6 hours 3 fish were separated from the experimental fish groups and observed in detail. Whole stomach and gut were extracted from these fish as well as samples of liver, kidney, gills and filet. Taken samples were rapidly cooled down in liquid nitrogen and stored in a refrigerator for further investigations.

Laboratory observations for the presence of ^{15}N in experimental fish gave an interesting outlook on the digestion and assimilation of the different dietary protein sources. The results demonstrated that enriched stable isotope tracers can provide a comprehensive overview on the digestibility, absorption and assimilation of nitrogen from individual protein sources in compound diets for tilapia.

Keywords: ^{15}N, enriched stable isotope, *Oreochromis niloticus*, protein assimilation, protein digestion, tilapia

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