CHEMICAL COMPOSITION OF TWO DIFFERENT NATURAL FOOD COMPLEXES PRESENT IN SEMI-INTENSIVE MILKFISH GROW-OUT PONDS

Lückstädt, C.*, Wirth, M., Focken, U. & Becker, K.

*Biomin Innovative Animal Nutrition – Biomin Deutschland GmbH, Gartenstrasse 17, 73119 Zell u. A., Germany, christian.lueckstaedt@biomin.net

Milkfish (*Chanos chanos* Forsskål) is the most important cultured finfish species in the Philippines. One of the management methods regularly used in milkfish pond culture is the semi-intensive production system, which includes the fertilization of ponds to enhance the growth of natural food and/or supplementation with artificial diets. Many studies have showed the growth-promoting effects of supplementary feeding. However, less is known about the chemical composition of natural food in such ponds. Two types of natural food are generally distinguished, a mat consisting of filamentous green algae (*lumut*) and a complex of filamentous and unicellular blue-green algae and diatoms (*lablab*). The goal of this study was to evaluate the chemical composition of both types of natural food.

Two commercial fish farms under different management methods were monitored on Panay Island, Philippines between March and August 1998. Natural food in one farm consisted mainly of *lumut*, while in the other farm *lablab* was the dominant type of natural food; both of these were collected and freeze-dried for later analysis of chemical composition (amino acids, trypsin inhibitor, fatty acids, carotenoids and mineral concentration). Results were compared with the nutrient requirements of milkfish.

Fish feeding on *lablab* had a higher growth rate than fish relying on *lumut* (SGR: 2.1% SGR vs. 1.0%). Average crude protein content of *lumut* and *lablab* was determined as 7.8% and 6.4% respectively. However, this difference was not significant, but non-protein nitrogen differed between *lablab* (1.2%) and *lumut* (22.7%). Consequently true-protein showed significant differences ($p<0.05$) between *lablab* and *lumut* with higher levels in *lablab*. Further, the amount of essential amino acids (EAA) tended to be higher in *lablab* (44.1%) than in *lumut* (42.6%), suggesting a higher protein quality in the former. A significant difference was observed in histidine with *lablab* showing higher levels (4.9%; *lumut*: 2.9%). For *lumut*, deficiencies in the required amounts of EAA for milkfish, based on the percentage of dietary protein, were detected for arginine, isoleucine, methionine and threonine, while *lablab* was deficient only in methionine. Crude fat content was low in both natural food types (< 1%) and essential fatty acids did not differ significantly between the samples. Total carotenoid content was significantly higher in *lumut* (105 µg g^{-1} dry matter, DM) than in *lablab* (24 µg g^{-1} DM), but carotenoids with provitamine A activity (e.g. β-carotene) were significantly higher in *lablab* (4.4 µg g^{-1} DM; *lumut*: 0.4 µg g^{-1} DM). Finally, the mineral concentration in both natural food complexes was at no point limiting for milkfish growth, but again differed significantly with higher levels of phosphorous in *lablab* (5 mg g^{-1} DM; *lumut*: 2 mg g^{-1} DM), sodium (46 mg g^{-1} DM; *lumut*: 24 mg g^{-1} DM) and manganese (0.5 mg g^{-1} DM; *lumut*: 0.4 mg g^{-1} DM).

These results suggested a higher metabolizability and nutritional quality of *lablab* over *lumut* due to a higher quality of dietary protein, no trypsin inhibitors and more retinol precursors.