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SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

Title: Dry matter, ash, and elemental composition of pond-cultured tilapia *Oreochromis aureus* and *O. niloticus*

Authors: Claude E. Boyd and Bartholomew W. Green
Department of Fisheries and Allied Aquacultures
Alabama Agricultural Experiment Station
Auburn University, Alabama 36849 USA

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Abstract: This study was conducted to determine the dry matter and elemental composition of two species of tilapia, *Oreochromis aureus* and *O. niloticus*. Thirty-two *O. aureus* (total length, 85–223 mm; live weight, 10.2–210 g) and 34 *O. niloticus* (total length, 61–282 mm; live weight, 13.7–282 g) were dried, cooled, and weighed to the nearest 0.01 g to calculate the percentage dry weight. From these samples, carbon and nitrogen analyses were made and ash content was determined. To calculate the concentrations of phosphorus, calcium, magnesium, sodium, potassium, iron, manganese, zinc, and copper, five ml of a 2 N acid solution were added to the ash. The mixture was dried and the remaining residue was diluted to volume with the 2 N acid solution in a 100 ml volumetric flask and filtered through acid-washed filter paper. Element concentrations of the two species of tilapia were calculated. Though fish samples represented a wide range in total length and total weight, regression analyses of concentrations of dry matter, ash, and individual elements (Y) on total length (X) did not reveal an influence of fish size on composition. Minor elements such as iron showed greater variation whereas major elements, ash, and dry matter showed less variation. Tilapia are comprised of approximately 25% dry matter—which consists of approximately 20% inorganic matter (ash), 80% organic matter, and 44% carbon—and 75% water. The average nitrogen concentration for both species combined was 8.7% and the protein content of the whole fish was approximately 56.6%. A correlation matrix was developed from simple linear regressions conducted between all combinations of individual elements in each species. Significant correlations among the elements were found, indicating that fish probably have a fairly consistent proportion of the different elements contained in their bodies. Two examples are provided illustrating how the data compiled in this study were used to compute efficiencies of nutrient utilization and potential nutrient loading in aquaculture ponds.

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