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Title: Growth and Morphological Changes in the Digestive Tract of Rainbow Trout (*Oncorhynchus mykiss*) and Pacu (*Piaractus mesopotamicus*) Due to Casein Replacement with Soybean Proteins

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Abstract: The effect of diets in which 50% of casein-gelatin protein was replaced with extracted soybean meal (SBM) or soybean protein concentrate (SPC) on first-feeding rainbow trout and juvenile South American pacu was examined following 3–6 fold body weight gain. A casein-gelatin-based diet supplemented with essential amino acids, lipids and other ingredients was used as control. After 4-weeks feeding, rainbow trout growth was significantly depressed in both SBM- and SPC-replacement treatments whereas pacu, the adults of which are considered omnivorous or frugivorous, showed significantly improved weight gain on the SBM-replacement diet. The enterocytes of posterior intestine of all control fish, and SBM-fed pacu showed regular shapes. Their supranuclear regions contained numerous small absorptive vacuoles. In trout fed SPC and SBM diets, and in SPC-fed pacu, posterior intestine enterocytes were excessively vacuolized. The highest pancreas activity (measured as the number of proenzyme granules) occurred in control fish. The liver cells showed regular development in both species fed the control diet and in pacu fed SBM and SPC diets. On the contrary, the hepatocytes of SBM and SPC-based diet fed rainbow trout showed anomalies. In both species, the average hepatocyte nuclear volumes significantly differed among the feeding groups. The results of histological analyses indicated that absorption and transport of nutrients to liver and pancreas were affected by the presence of soybean products in experimental diets. The SBM diet was beneficial for pacu but adversely affected rainbow trout, while the SPC diet resulted in extensive pathologies of digestive tract and most likely affected nutrient utilization in both species.

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