Fermenting rice bran as a carbon source for biofloc technology improved the water quality, growth, feeding efficiencies, and biochemical composition of African catfish Clarias gariepinus juveniles

ABSTRACT

In this study, African catfish (Clarias gariepinus) (9.68 ± 0.16 g, mean ± SE) were reared with biofloc technology (BFT) with three different carbon sources; raw rice bran (RRB) or when incubated (24 hr) with Bacillus species under aeration (cellular respiration, ResRB), or without aeration (fermentation, FerRB). The proximate composition, water solubility, and total soluble sugars of RRB, ResRB, and FerRB were measured. A control included fish cultured in a recirculating system. Water quality, biofloc production/proximate composition and subsequent effects to growth, feeding efficiencies, body proximate composition, and selected plasma biochemical parameters to triplicate groups of C. gariepinus were measured after 42 days. FerRB had the lowest crude fibre and higher total soluble sugars and water solubility compared to ResRB or RRB. Biofloc produced with FerRB had significantly higher ($p < 0.05$) crude protein. Ammonia-N was significantly lower ($p < 0.05$) in the first 3 weeks in both control and FerRB treatments. Using FerRB significantly improved ($p < 0.05$) growth, feeding efficiencies, and whole-body crude protein in African catfish compared to the control and ResRB. Therefore, using FerRB with BFT can be a highly effective strategy to create a zero-exchange culture system while also significantly improving growth and feeding efficiencies of African catfish juveniles.

Keyword: African catfish; Bacillus; Biofloc technology; Fermentation; Rice bran; Water solubility