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INDIRECT CRITERIA TO IMPROVE FEED EFFICIENCY IN RAINBOW TROUT: LINKS WITH BIOCHEMISTRY AND IMMUNE ACTIVITY

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Optimizing the use of commercial feeds by improving fish feed efficiency (FE) is critical to achieving sustainable aquaculture development. Accurately measuring individual feed intake (FI) in fish reared in groups is required for selective breeding programs to improve FE. Phenotyping individual FI through direct measurements remains complex. One way to overcome this challenge is to find indirect selection criteria for estimating FE. This study aimed to investigate the correlations between fish FE and potential predictive criteria (changes in body weight during feed deprivation and refeeding periods). Biochemistry and immunity indicators were followed through blood collection to highlight possible trade-offs in resource allocation. We used two rainbow trout lines divergently selected for muscle lipid content. These lines were chosen based on previously demonstrated potential FI and feed utilization differences. At about 170 g, 2,400 fish were placed in 2-m³ tanks (n = 6 tanks per line, 200 fish per tank), fed for four weeks using self-feeders, allowing recording of feed demands and measuring FI, and then kept unfed for three weeks prior measuring FI for the three subsequent weeks. Biometry (i.e. weight, length, adiposity, n = 1,200 fish/line) and blood analysis (n = 60 fish/line) were performed three times: prior to and after the feed deprivation period and then after the FI measuring period. This experiment evaluates the possible use of easy-to-measure indirect selection criteria in breeding programs on FE in rainbow trout and brings new insights into the relationships between feed utilization and other key biological functions such as immunity.