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Effect of dietary carbohydrate on the gene expression of *MyoD* and *Myf5* in *clarias batrachus* (Linnaeus, 1758)

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The nutritional regulation of skeletal muscle growth is very little documented in fish. It requires understanding of how dietary components are processed and trigger molecular, tissue and whole body response. A feeding trial of 60 days was conducted to study the growth trajectory, body composition, enzyme activities and expression of *MyoD* and *Myf5* genes in *Clarias batrachus* (Asian catfish) fingerlings fed with graded level of carbohydrate. 145 fishes were randomly distributed into four experimental groups in triplicates. Four iso-nitrogenous and iso-lipidic diets of 15%, 25%, 35% and 45% gelatinized carbohydrate designated as T1, T2, T3 and T4 respectively were prepared. White muscle samples were collected for every 15 days interval to study the expression of *MyoD* and *Myf5* genes. At the end of the experiment, fishes were sampled to study the growth parameters and enzyme activities. The growth parameters, such as weight gain, SGR, FCR and PER were not affected by dietary level of carbohydrate among T2, T3 and T4 treatment groups but significantly lower ($P < 0.05$) value was found to be in T1 group. Body composition differed among the treatments. Body lipid of T4 group was found to be significantly higher ($P < 0.05$) than the other treatments groups. Metabolic enzymes such as AST, ALT and hexokinase activity were not affected by dietary carbohydrate and found to be similar among the groups. G6PDH and amylase exhibit significantly ($P < 0.05$) higher activity in T3 and T4 group. The partial *MyoD* and *Myf5* gene were cloned and sequenced for the first time in *Clarias batrachus* (Linnaeus 1758) and their temporal expression was monitored in different intervals (15th, 30th, 45th and 60th day) in the experimental groups. Significantly higher ($P < 0.05$) mRNA expression of *MyoD* and *Myf5* gene was observed in T3 group (35% GC). *MyoD* and *Myf5* genes were upregulated on 60th day and 45th day respectively, during the feeding trial. Hence, overall result indicates that 35% carbohydrate can improve growth and promote myogenesis but higher carbohydrate will favor adipogenesis in *Clarias batrachus*. In addition, the study also reveals that *Myf5* shows more immediate response than *MyoD* to dietary carbohydrate. These studies demonstrate that carbohydrate can be a potent regulator of muscle development and growth and provide new opportunities in nutri-genomic studies.

Biography

Avinash Talukdar has completed his Master's degree from ICAR-CIFE, Mumbai having specialization in Fish Nutrition and Feed Technology. Currently, he is pursuing his PhD in the same specialization.

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