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**Influence of thiamine and pyridoxine loaded vanillic acid grafted chitosan microparticles (TPVGC) on anti-fatigue activity in male Wistar strain albino rats through swimming induced stress**

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The present investigation was conducted to study the influence of thiamine and pyridoxine loaded vanillic acid grafted chitosan microparticles (TPVGC) on anti-fatigue activity in male Wistar strain albino rats through swimming induced stress. Animals were distributed into four experimental groups which were fed varied levels of TPVGC for 45 days viz. Control (C) (basal feed + 0% TPVGC); T1 (basal feed + 0.8% TPVGC); T2 (basal feed + 1.6% TPVGC); T3 (basal feed + 2.4% TPVGC). The animals were exposed to swimming exercise during the experimental period of 45 days (45 min/day). At the end of the feeding trial, the stress mitigation role of TPVGC was assessed. Average swimming time and anti-fatigue activity during the experimental period revealed that the animals fed with graded level of TPVGC had more stamina and swimed actively. Whereas, animals in the control group fed without TPVGC were more lethargic after 30 min of swimming stress. Metabolic responses were assessed in terms of lactate dehydrogenase (LDH), malate dehydrogenase (MDH), catalase, superoxide dismutase (SOD) and acetylcholine esterase (AChE). LDH, MDH, catalase and SOD activities showed significant ( $p < 0.05$ ) differences between the control and

treatment group. The treatment group fed with graded level of TPVGC reduced enzyme activities. However, a reverse trend was observed for acetylcholine esterase. It was inferred that dietary supplementation of thiamine and pyridoxine loaded vanillic acid-grafted chitosan has stress mitigation role and enhanced stamina during swimming exercise.

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**Hepatic transcriptional changes associated with size heterogeneity in early life of rainbow trout**

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Intra-cohort growth heterogeneity is a prevalent problem in hatchery rearing of carnivorous fish species such as rainbow trout, *Oncorhynchus mykiss*. A complex array of environmental and biological factors have been implicated in the larval/juvenile size differences. However, transcriptional changes of growth-related genes are not well understood. In this context, we employed a candidate gene approach to examine the potential transcriptional differences that underlie size heterogeneity in the early life stage of rainbow trout. A five week growth trial was conducted in first-feeding rainbow trout fry weighing an average 192 mg. Triplicate groups of the experimental fish were fed a fish meal/oil based pellet crumbles containing 50% protein and 17% lipid, on dry matter basis. At the end of the experiment, the average weight and survival of fish were 2.9 g and 92.9%, respectively. Among the fish,