

## Effect of Dietary Sour Lemon Peel Essential Oil on Serum Parameters in Rainbow Trout (*Oncorhynchus mykiss*) Fingerlings against Deltamethrin Stress

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**Abstract :** The aim of this study was to investigate the effect of dietary lemon peel essential oil (*Citrus limon*) on serum parameters and liver enzyme activity of rainbow trout (*Oncorhynchus mykiss*) was exposed to deltamethrin. The 96-hour lethal concentrations of the toxin on rainbow trout (*Oncorhynchus mykiss*), was determined according to standard procedures O.E.C.D in static (Static). 96-hour LC50 was obtained 0.0082 mg/l by using statistical methods Probit program version. The maximum allowable concentration of deltamethrin was calculated 0.00082 mg/l in natural environment and was used for this experiment. Eight treatments were designed based on 3 levels of lemon essential oil 200, 400 and 600 mg/kg and 2 levels of deltamethrin 0 and 0.00082. Rainbow trout with an average weight of  $95.14 \pm 3.8$  g were distributed in 300-liter tanks and cultured for eight weeks. Fish were fed in an amount of 2% of body weight. Water changes were done on a daily basis (90 percent of the tank). About the tanks containing 10 % deltamethrin, after dewatering, suitable concentration of toxin was added to water. At the end of the test, serum biochemical parameters (total protein, albumin, glucose, cholesterol, and triglycerides) and liver enzymes (ALP, AST, ALT and LDH) were evaluated. In treatments without and with toxin, increasing 400 mg/kg oil increased total protein and albumin levels and lower cholesterol and triglycerides were observed ( $p < 0.05$ ). Rise to the level of 400 mg/kg of lemon peel essential oil treatments contain pesticides, reduced the amount of enzymes ALP, ALT and LDH compared to treatment of toxin-free lemon peel essential oil ( $p < 0.05$ ). The results showed that usage of lemon peel essential oil in fish diet can increase the immune system parameters and strengthen it with strong antioxidant activity followed by reducing the effect of deltamethrin on the immune system of fish and effective dose can prevent the adverse effects of toxin due to the weakening of the fish immune system at the time of toxic pollutant entrance in fish farms.

**Keywords :** deltamethrin, *Oncorhynchus mykiss*, LC5096h, lemon peel (*Citrus limon*) essential oil, serum parameters, liver enzymes

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