



## **Effect of dietary astaxanthin carotenoid on some biological indices in pre broodstock farmed females sterlet (*Acipenser ruthenus*)**

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### **Abstract**

This study was designed and conducted with the aim of detecting the effects of carotenoid astaxanthin on artificial reproductive efficiency, growth, and survivity and immunonological system of Sterlet, *Acipenser ruthenus* in a completely randomly design including: diet without additive carotenoid (control), treatment 1 (diet having 15 mg/kg astaxanthin), treatment 2 (diet having 45 mg/kg astaxanthin) and treatment 3 (diet having 75 mg/kg astaxanthin) with 3 replicates. A total of 48 pre broodstock of *Acipenser ruthenus* (with mean weight  $600 \pm 14.5$  g) were selected and transferred to fiberglass 500 lit tanks. Comparative results of weight during rearing duration showed significant increase in fish ( $P < 0.05$ ). The most percentage of fertility among different treatments of astaxanthin was observed at concentration 75 mg/kg ( $P < 0.05$ ). Results showed that hatching rate of larvae in control was lower significantly than concentrations 45 and 75 mg/kg ( $P < 0.05$ ). Based on obtained results of total carotenoid at different embryological growth stages, the least amount was observed post yolk sac absorption (PY) that showed significant decrease in comparison with ovulation (before fertility) ( $P < 0.05$ ). Minimum residual levels of cantazantine and Beta carotene observed at stage PY and showed significant difference compared to ovulation stage ( $P < 0.05$ ). Differential count results of leukocytes showed that lymphocytes at concentration 75 mg/kg of



astaxanthin was lower significantly compared to concentrations 15 and 45 mg/kg ( $P < 0.05$ ). Lysozyme levels showed no significant difference compared to control ( $P > 0.05$ ). IgM levels at concentrations 45 and 75 mg/kg was lower significantly compared to 15 mg/kg ( $P < 0.05$ ). Results showed  $C_4$  levels at concentration 45 mg/kg was lower significantly compared to other treatments ( $P < 0.05$ ). Based on results,  $C_3$  levels at concentrations 45 and 75 mg/kg was lower significantly compared to other treatments ( $P < 0.05$ ). By notice to obtained results, Adding 75 mg/kg to diet improved reproductive and immunity efficiency compared to control. So it suggests adding astaxanthin into diet of *Acipenser ruthenus*.

**Keywords:** Astaxanthin, Artificial propagation, Growth indices, Immunity, Sturgeon, *Acipenser ruthenus*