

Dietary supplementation of astaxanthin enhances hemato-biochemistry and innate immunity of Asian seabass, *Lates calcarifer* (Bloch, 1790)

ABSTRACT

This study aimed to evaluate the impacts of dietary astaxanthin supplementation on hematology, blood biochemistry and innate immunity of Asian seabass *Lates calcarifer*, with special reference to dose-response associations and variations over different phases of feeding (short-term, medium-term and long-term). Triplicate groups of fish ($n = 30$) with an average weight of 28 g were fed astaxanthin-incorporated diets (AX50, 50 mg kg⁻¹ diet; AX100, 100 mg kg⁻¹ diet; AX150, 150 mg kg⁻¹ diet) for 90 days. A diet without astaxanthin supplement (CD) served as the control. Our findings demonstrated that fish displayed significant enhancements ($P < .05$) in hematological indices (white blood cell count, red blood cell count, hemoglobin and hematocrit) when fed various diets with elevated doses of astaxanthin throughout the specified phases of feeding. Serum concentrations of alanine aminotransferase (ALT), aspartate aminotransferase (AST), glucose, and cortisol in fish fed the supplemented diets decreased significantly ($P < .05$) with increasing dietary inclusion levels. Moreover, the provision of dietary astaxanthin at escalating doses markedly reduced ($P < .05$) the circulating levels of serum cholesterol (proportionately) and triglyceride (dose-dependently) in fish, following three consecutive feeding phases. Correspondingly, the supplemented fish exhibited much higher ($P < .05$) serum total protein content associated with astaxanthin administration. Immunological parameters (respiratory burst activity, lysozyme activity, phagocytic activity, and serum total immunoglobulin) of fish were significantly stimulated ($P < .05$) in response to dietary intervention with astaxanthin. The present investigation highlights the ameliorating effect of dietary astaxanthin on hemato-biochemical and immunological variables of Asian seabass and could be administered in culture protocols to improve fish immunocompetence and health.

Keyword: Asian seabass; Dietary astaxanthin; Feeding phase; Hemato-biochemistry;

Innate immunity; Supplementation