

Title : Effects of Chitosan on Oxidative Stress Biomarkers and Histopathological Changes in Whiteleg Shrimp (*Litopenaeus vannamei*)

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ABSTRACT

Whiteleg shrimp (*Litopenaeus vannamei*) is a crustacean species that is extensively cultivated and exported across the Americas, Europe, and Asia, including Thailand. As a result, whiteleg shrimp has become one of the most important aquaculture species. According to viral, bacterial, parasitic, and fungal infections, as well as physiological stress arising from an imbalance between reactive oxygen species (ROS) and antioxidant defense mechanisms, can lead to abnormal clinical manifestations in shrimp and, in severe cases, mortality.

In the present study, chitosan, a biopolymer widely utilized in pharmaceutical and nutraceutical applications, was incorporated into shrimp feed and divided into 5 groups, including the control group, the non-irradiated chitosan group, the irradiated chitosan at different concentrations of 0.1%, 0.2% and 0.4% of feed, respectively. Shrimp samples were collected and analyzed through biochemical and histopathological examinations to assess the effects on various organs in comparison with a control group.

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The results indicated that shrimp receiving irradiated chitosan at 0.2% of feed demonstrated effective antioxidant activity and a reduction in oxidative damage across several organs. These findings were consistent with the histopathological observations, which revealed normal organ structures. In contrast, shrimp fed non-irradiated chitosan, and those receiving irradiated chitosan at 0.1% of feed did not exhibit sufficient efficacy in reducing reactive oxygen species. For supplementation with irradiated chitosan at 0.4% of feed significantly increased glutathione (GSH) levels, it may have induced tissue stress in certain organs, such as the intestine.

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