

学位論文全文に代わる要約  
**Extended Summary in Lieu of Dissertation**

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学位論文題目 : Function analysis of insects for effective use in aquaculture.  
Title of Dissertation (水産養殖における昆虫の有効利用を目指した機能解析)

学位論文要約 :  
Dissertation Summary

Insects have a role in food supply for human. Recently they began to be drawn great attentions around the world as underutilized natural resources that could resolve current our food and feed problems. Not only as animal protein source, but insects are thought to be rich in various molecules with pharmacological functions. In this study we focused on 2 species of Diptera; house fly (*Musca domestica*) and melon fly (*Bactrocera cucurbitae*). In chapter I, we described dietary effects of housefly (*Musca domestica*) pupae in red sea bream (*Pagrus major*). The addition of housefly pupae to the diets significantly conduced to the increase of growth of red sea bream. We also found that dietary housefly pupae enhanced significantly the peritoneal leukocyte phagocytic activity and provided significantly protection against a disease. Furthermore, we showed that addition of housefly pupae to the diets dose not negatively affect on the health of rats (*Rattus norvegicus*). In chapter II, a novel water-soluble polysaccharide was identified in the pupae of the melon fly (*Bactrocera cucurbitae*) as a molecule that activates the innate immune response. We attempted to purify this innate immune activator using nitric oxide (NO) production as an indicator of immunostimulatory activity. A novel acidic polysaccharide synthesized in the melon fly itself at the pupal stage was identified and named “dipterose”. It stimulates the induction of various cytokines in RAW264 cells via the TLR4 signaling pathway. We demonstrate the function of house fly pupae and melon fly pupae and show the utilization of these 2 species in the field of food production, especially aquaculture.

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