A Mitochondrial Model to Evaluate Endogenous Peroxidation in Litopenaeus vannamei: an in vitro Tool to Research Cellular Mechanisms of Antioxidants

Xiao-Hua Liu\textsuperscript{a,b,c}, Jun-Ming Cao\textsuperscript{b,*}, Zhen-Yu Du\textsuperscript{d}, Yan-Hua Huang\textsuperscript{b}, Hong-Xia Zhao\textsuperscript{b}, Xuan Zhu\textsuperscript{b}, Meng Zhou\textsuperscript{b}, Han-Bing Lan\textsuperscript{b}, Cong-Xin Xie\textsuperscript{a*}

\textsuperscript{a} Fisheries College, Huazhong Agricultural University, Wuhan 430070, China
\textsuperscript{b} Institute of Animal Science, Guangdong Academy of Agricultural Sciences, Guangzhou 510640, China
\textsuperscript{c} Institute of Animal Science and Veterinary Medicine of Wuhan, Wuhan 430065, China
\textsuperscript{d} National Institute of Nutrition and Seafood Research (NIFES), Bergen 5005, Norway

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Abstract

Mitochondrial lipid peroxidation is an important index in evaluating cellular oxidative states in biomedical research. In order to develop a method to study lipid peroxidative process and cellular mechanisms of antioxidants in aquatic animals, we established a mitochondrial model to evaluate endogenous peroxidation in Litopenaeus vannamei. The mitochondrial fraction was isolated from the hepatopancreas and mitochondrial lipid peroxidation was induced by ascorbic acid/FeSO\textsubscript{4} or NADH to evaluate thiobarbituric acid reactive substances (TBARS), the mitochondrial swelling rate, and the unwinding rate of the DNA helix. Induced mitochondrial peroxidation was significantly inhibited by low doses of exogenous reduced glutathione (GSH), which is used as an antioxidant in humans and other mammals but is not commonly applied in aquaculture. Our in vitro model can be an effective tool for studying cellular mechanisms of antioxidants.

* Corresponding authors. Jun-Ming Cao, tel.: +86-20-87596219, fax: +86-20-87503358, e-mail: junmcao@163.com; Cong-Xin Xie, tel.: +86-27-87282113, fax: +86-27-87282114, e-mail: xiecongxin@mail.hzau.edu.cn