

Intervention effect of silymarin on hepatopancreatic injury induced by acute deltamethrin exposure in *Eriocheir sinensis*



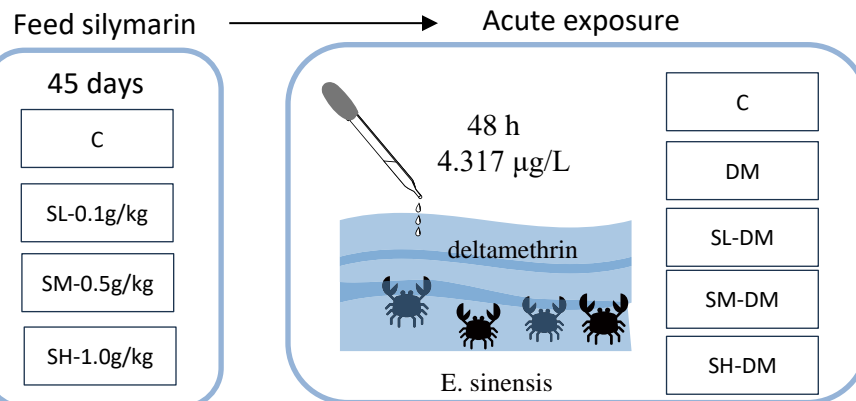
Zhiruo Fang¹, Jinliang Du^{*}, Gangchun Xu^{1*}

¹ College of Fisheries and Life Science, Shanghai Ocean University * Key Laboratory of Freshwater Fisheries and Germplasm Resources Utilization

Introduction

Eriocheir sinensis is an important freshwater farmed crustacean in China, which is widely appreciated by consumers for its rich and delicious flavor, with a total yield of 888,600 tons achieved in 2023. With the improvement of aquaculture technology, the insecticide deltamethrin has been widely used in aquaculture because of its low toxicity and stability to light. Deltamethrin is lipid-soluble and easily toxic to hepatopancreas, the immune organ of *Eriocheir sinensis*. At present, it has been proved that the Chinese herbs and their active ingredients in aquatic feed can not only effectively combat the stress of aquatic animals and the stress of toxic environment, but also promote the appetite of aquatic animals and improve muscle quality. Silymarin is a kind of natural and safe Chinese herbal preparation, which has many biological functions such as liver protection, anti-oxidation and immune regulation. In this study, different gradient concentrations of silymarin were added to feed, and then acute deltamethrin exposure induced hepatopancreas injury in *Eriocheir sinensis*. The aim is to enhance the immune ability of crab, reduce the occurrence of disease, and carry out the research on the related mechanism of protection of Chinese herbal medicine.

Methods



Results

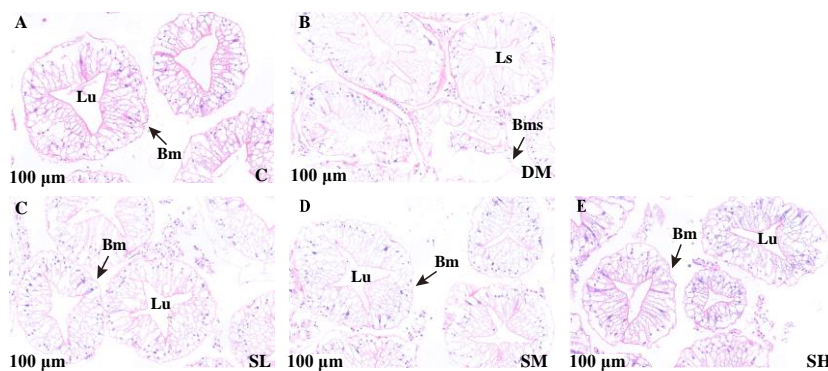


Figure 1. H&E staining of hepatopancreas in *Eriocheir sinensis* with different supplemental levels of silymarin under acute deltamethrin exposure.

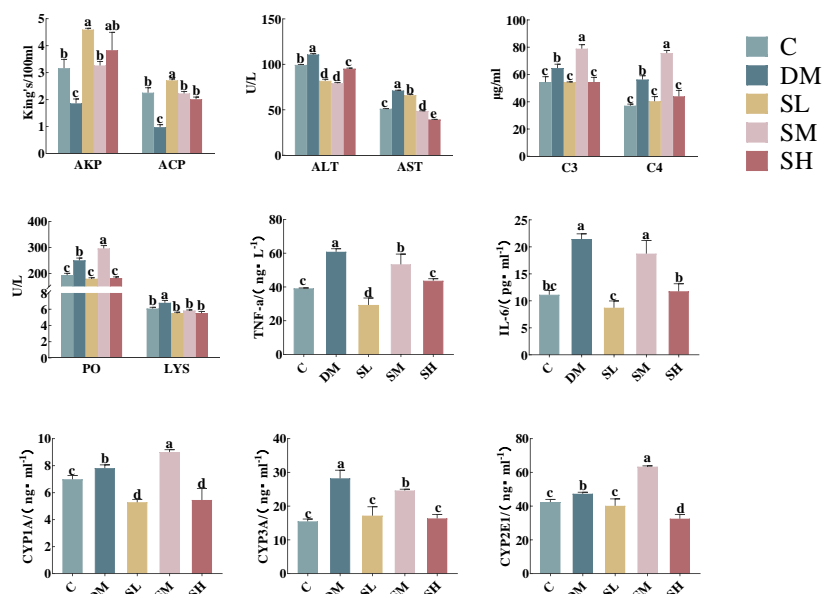


Figure 2. Effects of silymarin on immune, inflammatory and drug metabolizing enzymes in *Eriocheir sinensis*.

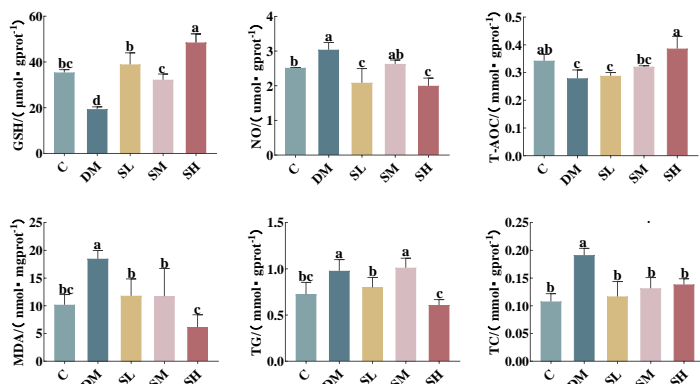


Figure 3. Effects of silymarin on antioxidant enzyme activities and lipid metabolism in *Eriocheir sinensis*.

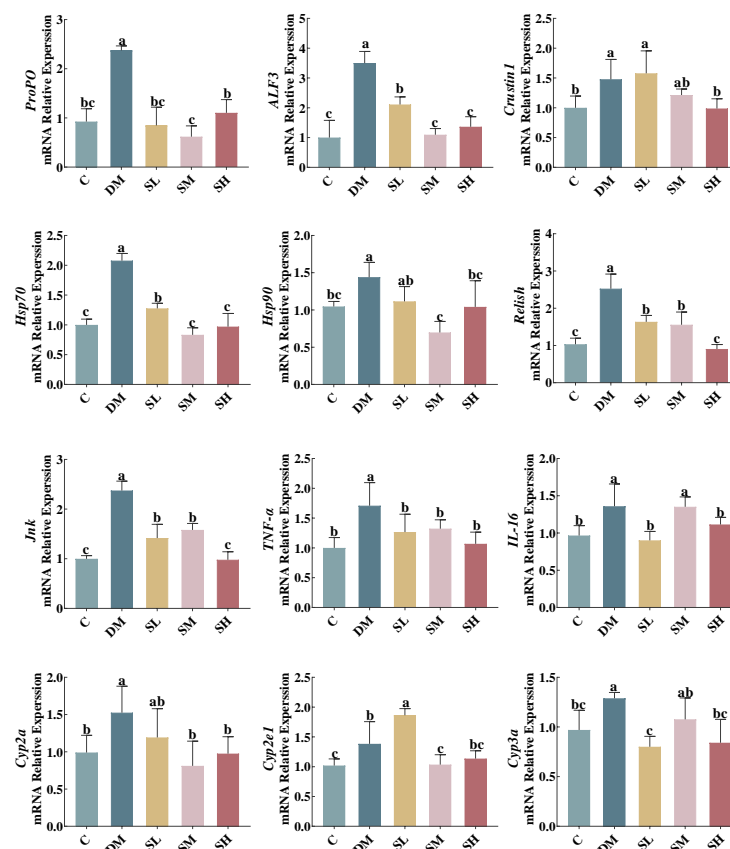


Figure 4. Effects of silymarin on mRNA expression of genes related to immune factors, inflammatory factors and drug metabolism enzymes.

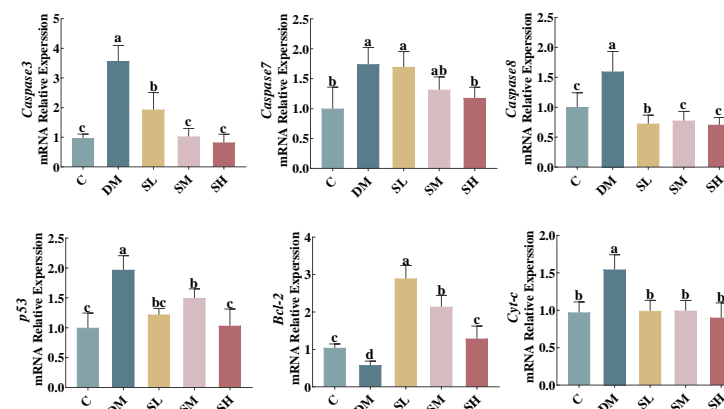


Figure 5. Effect of silymarin on mRNA expression of apoptosis-related genes.

Conclusions

Adding 1.0 g/kg silybin to the diet could alleviate deltamethrin-induced oxidative stress, apoptosis and inflammation, reduce lipid accumulation, and maintain the integrity of hepatopancreas structure and function in *Eriocheir sinensis*.