

CHAPTER 4

CONCLUSIONS

1. Enzymes in both muscle and cephalothorax of black tiger shrimp and white shrimp varied slightly in characteristics and properties. Proteases in shrimp muscle were active at neutral pHs and high temperature (70°C). Major proteases from the muscle of both shrimps were serine proteases. Collagenase from the cephalothorax and the muscle of both shrimps generally showed the highest activity at 55°C in the neutral pH ranges. However, pH and thermal stability varied with species and portions. Polyphenoloxidase (PPO) from cephalothorax of black tiger shrimp and white shrimp had the optimal temperature of 50°C and 45°C, respectively. However it was unstable at a temperature greater than 40-45°C and was active at slightly acidic and neutral pHs. PPO activity from both shrimps was strongly inhibited by ascorbic acid.

2. MAP was found to be an effective method to prolong the shelf-life of black tiger shrimp and white shrimp during the refrigerate storage, mainly due to a substantial reduction of the microbial growth. This led to the delayed spoilage and protein degradation. MAP with 80% CO₂ showed the higher efficacy in extending the shelf-life of both black tiger shrimp and white shrimp. However, lowered water holding capacity of shrimp was a drawback of shrimps kept under MAP. PP at a level of 2% (w/v) was used to tackle this problem.

3. Pretreatment of white shrimp with PP and ascorbic acid prior to storage under MAP was effective in reducing microbial numbers and improving water holding capacity. Furthermore, melanosis was decreased. Nevertheless, ascorbic acid treated samples turned to be slightly orange, especially at the legs.

4. Pretreatment of white shrimp with 0.25% 4-HR prior to MAP (80% CO₂, 20% N₂) storage resulted in the marked decrease in malenosis. This could be related to PPO inhibition as well as the absence of O₂ involved in melanosis formation. 4-HR at the level used also caused the orange discoloration to a high extent.

5. The decapitation could lower melanosis effectively throughout the storage, regardless of atmosphere or PP and 4-HR treatment. Therefore, the removal of the cephalothorax in combination with pretreatment with PP or 4-HR showed the synergistic effect on shelf-life extension and lowering melanosis caused by PPO.

6. MAP of decapitated shrimps pretreated with PP could extend shelf-life up to 12 days of storage at 4°C.

Future works

Further studies are suggested to be conducted to fully apply MAP as the effective preservative method for shrimp.

1. Study on the use of 4-HR in combination with other melanosis inhibitors (citric acid, ascorbic acid, acetic acid, EDTA and sodium pyrophosphate) to obtain the maximized effectiveness in melanosis inhibition.

2. Study on the treatment of melanosis inhibitor in shrimp with the aid of pressure to facilitate the penetration of those compounds.

3. Study on the prior freeze-thawing of shrimps on melanosis and quality of shrimp kept in MAP during the refrigerated storage.