



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The present study on osmoregulation and maturation of giant tiger prawn, *Penaeus monodon* Fabricius in recirculating water system leads to the following results:

1. Subadult prawns act as the hypo-hyperosmoregulator in salinity from 20 ‰ and 45 ‰. The isosmotic point is about 28 ‰.

2. Eyestalk ablation has a effect on osmoregulation. Haemolymph concentration of ablated prawn is less concentrated than of unablated ones. The effect of eyestalk ablation on osmoregulation is very clear when prawn are held in salinity higher than 40 ‰.

3. After the acclimation at the salinities of 30 ‰ and 40 ‰ for 1, 2, 7, 15, 30, and 45 days haemolymph concentration of subadult prawns did not show significant difference at these two salinities ($P < 0.05$).

4. Without eyestalk ablation, hypersaline acclimation can accerelate gonad development in adult *Penaeus monodon*. The regression analysis shows that there is a significant relationship between ovarian index and acclimation period in both 30 and 40 ‰. The linear equation are shown as follows:

$$\%GI_{30} = 0.266 + 0.039 \text{ Time}, (P= 0.0001, R^2 = 0.411)$$

$$\%GI_{40} = 0.393 + 0.029 \text{ Time}, (P= 0.0001, R^2 = 0.302),$$

where $\%GI_{30}$ is ovarian index of prawn acclimated at 30 ‰, $\%GI_{40}$ is ovarian index of female prawn acclimated at 40 ‰ and Time is acclimation time in days.

5. Subadult *Penaeus monodon* (5-month-old) from intensive prawn farm can be used as the broodstocks in recirculating water system. Their maturation process can be accelerated in hypersaline condition both in small size and large size group (normal size subadult). However, large size subadult which has high condition index is more suitable for this purpose.

Eyestalk ablation also affects ovarian maturation in subadult prawn. It accelerates ovarian development in large size subadult while depresses ovarian development in small size subadult. Ablation in hypersaline condition should not exceed 30 days because of the hormonal imbalance and the chronic effects of a long-term stress.

6. Most suitable treatment method for induce maturation of subadult *Penaeus monodon* is TRM-11, i.e. eyestalk ablation and immediately acclimate at 40 ‰ for 30 days and then transfer to 30 ‰ for 15 days of acclimation.

7. Hypersalinity at 30 ‰ and 40 ‰ and/or combination with eyestalk ablation do not significantly influence the molting interval of subadult and adult *Penaeus monodon*. Molting interval of adult is longer more than subadult and was not different between females and males ($P < 0.05$).

8. Histological examination indicate that hypersalinities at 30 and 40 ‰ show no effect on morphology and size of mature oocytes. The ovarian maturation cycle of *Penaeus monodon* in these condition has a similar pattern as in nature. Ovarian development stages based on histological examination are classified to six stages; undeveloped, developing, nearly gravid, mature or gravid, inactive, and redeveloping.

9. Water quality of the closed recirculating water system is in optimal range as controlled level. Calcium concentration in the rearing system depends on four factors; salinity of diluted water, brine water; calcium concentration of tap water, and time passing oyster filter bed.

Recommendations

1. The best salinity level for subadult prawn rearing is 28 ‰, the isosmotic point. Isosmotic point is optimal for physiological mechanisms and less stress than hyposalinity and hypersaline condition.

2. Seawater which is diluted from brine water has a low Ca:S ‰ than normal ratio. Because this, the diluted water when use in closed recirculating water system should be recirculated through the filter bed for about 15 days to increase to normal ratio. Furthermore, brine water that salinity is higher than 70 ‰ is not suggested to be used in the prawn rearing water system.

3. This present work indicates that diluted brine water in recirculating water system can possibly be used in order to induce maturation process in *Penaeus monodon*, especially at high salinities, i.e. 30 ‰ and 40 ‰. However, the result should be confirmed with more sample size by focusing on some treatments such as TRM-11.

4. TRM-11 (eyestalk ablation and immediately acclimate to 40 ‰ for 30 days and then transfer to 30 ‰ for 15 days acclimation) can induce maturation in subadult prawn, 5-month-old. However, this method may be better for adult prawn which has high degree of maturity. In addition, the eyestalk ablated and sudden 15 days acclimated at 40 ‰ and then transferred to salinity 30 ‰ may be better than TRM-11.

5. Although hypersalinity acclimation accelerates the maturation rate, eyestalk ablation can superimpose on inducing maturation process under a period of time with a minimum stress.

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