

Chapter 1

Introduction



1.1 General

Application of anti-foulants is necessary for marine vessels to maintain their transportation performance. Tributyltin oxide (TBTO) is the most effective biocide employed in anti-fouling paint formulae. Due to its toxicity to non-target organisms, impact on aquatic resources has risen. Regulations and controls have been set up in many countries which suffer from the impacts. Because the development of efficient tin-free alternatives are on its way accompanied with the immature ban of TBT booster application, TBT contamination still takes place including in Thai waters (Bech, 1999; Kan-Atireklap *et al.*, 1997a; 1997b).

Most studies on TBT toxicity to aquatic organisms are available on temperate species. Research on tropical organisms are rather limited. As regards native species, black tiger prawn *Peneaus monodon* (Songkrit Prapakdee, 1995) and sea perch *Lates calcarifer* (Warintorn Manosittisak, 1996) are the only two local species tested for the response to TBTO. Both species are tested for a short-term exposure in larval and juvenile stages, respectively. The experiment over embryonic and/or larval development have not been conducted in native species yet.

The familiar and economical valuable species, giant freshwater prawn *Macrobrachium rosenbergii* was chosen in the present study as it spends its early life cycle in the estuaries and has a risk of TBT contamination. Although the eggs attached to mother prawns generally experience freshwater environments, it does not guarantee the protection of eggs from TBT due to lack of contamination profiles in Thai riverine systems.

1.2 Objectives

The purposes of this study are:

1. To investigate both acute and subacute effects of TBTO on the embryonic development, incubation periods, and hatching successes.
2. To determine the affected developmental rates of the larvae exposed to different concentrations of TBTO, and to find the LC_{50} s of each early life stages of development.

1.3 Scope of study

The experimental conditions consisted of static test solutions with daily renewal. The first to sixth stage of larvae would be tested to TBTO in acute terms for evaluating the appropriate range of concentrations for subchronic tests.

1.4 Expectations

1. Effects of TBTO on embryonic development, hatching time and success, survival rate, and larval development
2. Comparison of the sensitivity to TBTO of *M. rosenbergii* to other aquatic organisms.
3. Database in TBT ecotoxicology to native brackish species.
4. Feasibility of *M. rosenbergii* for using as standard testing animal.