Warucha Kanchana-Aksorn 2009: Use of Freshwater Oligochaete (*Limnodrilus hoffmeisteri*) in Sediment Bioassay. Doctor of Philosophy (Marine Science), Major Field: Marine Science, Department of Marine Science. Thesis Advisor: Associate Professor Saran Petpiroon, Ph.D. 194 pages.

The research on using freshwater oligochaete *Limnodrilus hoffmeisteri* in sediment bioassay was carried out to cover four purposes, including investigation on its morphological feature and biological behavior, estimation on its specific growth and biological activity, assessing its tolerance to the toxicity of naphthalene spiked-sediment, and determination on its bioaccumulation and trophic transfer of such chemical contaminated in sediment via a fingerling predator, *Oreochromis niloticus.*

The result showed that *L. hoffmeisteri* collected from Chao Phraya estuary were totally immature. This organism showed important behaviors consisting of active swimming, burrowing, clump living, feeding habit and defecation. The results from laboratorial culturing showed significant increase of number of individual and weight in the treatment added by high level of food indicated the reproduction of *L. hoffmeisteri* occurred after 35 d of the experiment. These increasing values affected the decrease of TOM in the sediment and increase of DO in the overlying water. The results from toxicity test showed acute effect of naphthalene to the worms with the 72 h and 96 h LC_{50} values of 85.11 and 60.26 µg/g wwt, respectively. In addition, sublethal responses found the 96 h EC_{50} values for autotomy and sediment avoidance were 35.48 and 58.88 µg/g wwt, respectively, while the 96 h LOEC reworking activity value was 25 µg/g wwt. The results from bioaccumulation test showed naphthalene was transferred from sediment and accumulated in a brief period in *L. hoffmeisteri* with the peak of residue highest during 24 h of the exposure. Average tissue residue and BAFs were 1038.83±564.56 µg/g dwt and 31.97±17.07, respectively. The study on trophic transfer showed fluctuation of fish residues, distinctly increasing during 6 h after feeding, and then suddenly decreasing if feeding was stopped. This occurrence appeared due to the process of food digestion and metabolism in tilapia. These evidences implied that naphthalene was not biomagnify to *O. niloticus* via eating *L. hoffmeisteri* in this aquatic food chain model.

_____ _____ ___ / ___ / ___

Student's signature Thesis Advisor's signature