CHAPTER I

INTRODUCTION

Sandworms are used as live feed for shrimp farm especially shrimp broodstock to obtain better maturation and oocyte and sperm production (Wouters *et al.*, 2001a). The wild sandworms for broodstock were collected from sandy beach which may be a carrier of pathogens to shrimp farms. Moreover, environment and worm habitat were destroyed by the worm collecting activities. For these reasons, sandworm farming scale was developed by Chunhabandit (1991) for reducing environmental damage and pathogen carrier. Nowadays farmed sandworm is supplied to shrimp hatcheries as specific pathogen free feed. However, farmed sandworm is fed with a commercial diet and grew in farming system while wild sandworm fed by scavenging which may be differed in nutritional values. Beside, little is known about nutritional values of farmed and wild sandworms.

In the other hand, in recent years overuse of antibiotics has resulted in the rapid evolution of multiple antibiotic resistant bacteria, which have caused a variety of incurable infectious diseases. The novel antimicrobial agents have been identified to control the increasing of antibiotic resistant bacteria. One is antimicrobial peptides (AMPs), they have been isolated over the last two decades (Vizioli and Salzet, 2002). AMPs have been produced by many tissues and cell types in various species ranging from bacteria, invertebrates to mammals, including humans. They are encoded by the genome and produced through regular processes of gene transcription. Now, more than 880 antimicrobial peptides have been identified or predicted from nucleic acid

sequences (Leng *et al.*, 2005). AMPs are the earliest molecular factors in evolution of innate immunity and are considered to play a key role in invertebrate host defense. They display broad spectrum activity against pathogenic bacteria, fungi and enveloped virus even cancer cells (Ovchinnikava *et al.*, 2004). Most AMPs display hydrophobic and cationic properties, have a molecular mass below 10 kDa and take an amphipathic structure that is believed to be essential for their antimicrobial action. The efficiency of them is depended on charge and structure. Their activities can be rapid, antimicrobial peptides kill bacteria so quickly (15–90 minutes). When they attach and insert into membrane bilayers to form pores, the pore size cause leakage of cytoplasmic material and hence death of the microbe cell will occur (Brogden, 2005).

Aquatic invertebrate species also have antimicrobial peptide defense system. A variety of antimicrobial peptide were discovered and characterized from representatives of aquatic invertebrates, including marine sponge, molluscs, chelicerata, crustaceans, ascidians and polychaetes (Ovchinnikava *et al.*, 2006). AMPs from marine organisms could afforded design of new antibiotics that broad spectrum antimicrobial activity and new antibiotics in aquaculture industries. Marine polychaetes as other aquatic invertebrate animals which use their innate immune system by AMPs. A few AMPs were found in marine polychaetes such as arenicin form *Arenicola marina* (Ovchinnikava *et al.*, 2004), perinerin from *Perinereis aibuhitensis* (Pan *et al.*, 2004) and hedistin from *Nereis diversicolor* (Tasiemski *et al.*, 2007). From these data, sandworm *Perinereis nuntia* Savigny (phylum Annelida, class Polychaeta) has been chosen to investigate for AMPs in this research.

As describe above about the nutritional values of sandworm and the AMPs, the objectives of this research are

1. To analyze proximate chemical composition and energy content of farmed and wild sandworm *Perinereis nuntia* Savigny
2. To isolate, purify and characterization of antimicrobial peptide from sandworm *Perinereis nuntia* Savigny