CHAPTER 1

INTRODUCTION

Chitin is one of the most important biopolymers in nature and is estimated annually to be produced almost as much as cellulose. It is mainly found in arthropod exoskeletons, fungal cell walls or nematode eggshells (Merzendofer and Zimoch, 2003). The main sources of raw material for the production of chitin are cuticles of various crustaceans, principally crabs and shrimps (Jo *et al.*, 2008).

Marine crustacean wastes are very rich in chitin. It is estimated that the worldwide annual recovery of chitin from the processing of marine crustacean wastes is 37,300 tons (Jen *et al.*, 1999).

The use of chitin and chitosan in food and other specialized applications is a good example of recycling of organic solid waste and by-products generated by the food industry itself to obtain added-value products. An increased interest in these natural biopolymers has been evident from a scientific perspective since at least the early 70's. Due to their unique properties and wide range of applications and this trend has remained so in the past decade in spite of the fact that the actual sales have remained well below the projections made eight years ago, when estimates of total world sales were expected to increase at a rate of 2% per year to yield a potential market of about 2 billion dollars by the end of the century (Goycoolea *et al.*, 2000)

Shrimp and crab shell contain chitin, protein, and inorganic compounds such as calcium carbonate (Jen *et al.*, 1999). Thus, chitin in biomass is closely associated with proteins, minerals, lipids, and pigments (Jo *et al.*, 2008). Therefore, conventionally preparation chitin from such shellfish chitin wastes involves deproteinization and demineralization are important to used strong bases and acid. The chemical treatments also create waste disposal problems, because neutralization and detoxification of discharged wastewater are necessary. Furthermore, the value of the deproteinization liquid is diminished because of the presence of sodiumhydroxide.

The production of chitin by using enzyme producing microorganism is a green technology in the utilization of shellfish processing wastes (San *et al.*, 2005).

For alternative approaches to overcome the shortage of the chemical treatments, microorganisms, and proteolytic enzymes for the deproteinization of crustacean wastes has been applied (Jo *et al.*, 2008).

A few studies on the use of protease-producing bacteria for the deproteinization of shrimp wastes have been reported, but little has been done with crab shell wastes (Jo *et al.*, 2008).

The objectives of this study were to isolate and screen for microorganisms, which grow on chitin medium and produce protease. It was demonstrated that protease-producing isolate ECM04 could be used for deproteinization of crustacean wastes. The optimum culture conditions for maximal protease productivity were also studied and the protease produced under such culture conditions was used for deproteinization of crab shell waste.