1. INTRODUCTION

Chitin is the second most abundant renewable polysaccharide in nature. It can be found in a large number of insects and various marine species, such as shellfish, krill, clams, oyster, and squid. As a maritime country, Indonesia has the potential to be a leading shellfish producer in the world, hence a prominent producer of chitin. Statistics shows that the country’s shellfish processing industry produces about 56,200 ton of waste (Anonymous, 2000), a big potential of raw material for chitin industry. Within crustacean shell, chitin contributes 50-80% of organic compounds (Hirano, 1997). Water insolubility, however, causes the industrial application of chitin face a significant challenge. In line with this, one way to be explored to overcome the problem is by converting chitin to its derivatives such as chitosans and its oligomer.

Chitosan is a deacetylated form of chitin, a polymer of heteropolysaccharide and composed of N-acetyl glucosamine and 70% or more N-glucosamine. Chitosan and its oligomers have drawn much of public attention in the past few decades due to their potential broad range of industrial applications. For example, they have been used for various biomedical applications such as in burn treatment, wound healing, and body weight management (Hirano, 1997; Anonymous, 2001).

More recently, chitosan oligomers or chitooligosaccharides are produced primarily due to the good market of chitosan-based dietary supplement. Functional characteristics of chitosan oligomer in dietary supplement products include its ability to bind fat, bile salts and cholesterol in the digestive tract of humans, and prevent them from being absorbed by the human body. Dietary supplement, however, requires certain characteristics, namely high purity, high binding capacity and high viscosity. These requirements can be met by applying enzymatic processes, wherein chitosanase plays a crucial role. Enzymatic hydrolysis of chitosan allows specific and high degree polymerization to take place. This is very desirable because the polymers have active biological properties, i.e., antibacterial, antifungal, hypocholesterolemic activity, and anti hypertensive action.
For a country known for its marine biodiversity such as Indonesia, the existence of thermostable chitosanases is advantageous. Locally produced chitosanase will enable the country to competitively produce high value chitin derivatives. The success of research and production of an indigenous thermostable chitosanase will bring double benefit. In addition to scientific contribution, such a success will also lead to considerable economic opportunities associated with the necessary support to domestic quality-chitin industry.

A number of bacteria possessing chitinolytic enzymes have been isolated from several hot spring water in Manado. Of the 45 positive chitinolytic isolates from Tompasso, four isolates produced the highest index chitinolytic (Jayanti. 2002). In this study, chitosanase was screened from chitinolytic bacteria previously isolated from Manado.

The objectives of this study were set out as follow:

1. To select chitosanase producers from Manado hot spring water, produce and purify the enzyme
2. To analyze biochemical and kinetic characteristics of the enzyme, and
3. To classify the enzyme based on biochemical characteristics and bioinformatics—molecular study

The expected outputs of the study are techniques for production and purification of chitosanase from bacteria and information on the biochemical characteristics, as well as classification of the enzyme. The information will be useful for future industrial application of the enzymes in marine bioindustry such as enzymatic production of chitosan based product, as well as for understanding of structure-characteristic-function of thermostable protein/enzyme.