CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME II

Editors:

Ibrahim Ali Noorbatcha
Hamzah Mohd. Salleh
Mohamed Elwathig Saeed Mirghani
Raha Ahmad Raus

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CHAPTER 30

MECHANICAL IMPROVEMENT OF HALAL GELATIN FROM MARINE SOURCES

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ABSTRACT

Gelatin replacement has existed for many years for the vegetarian, halal and kosher markets, but has gained increased interest in the last decade, particularly within Europe with the emergence of bovine spongiform encephalopathy or as known as mad cow disease. Since most commercial gelatins are obtained from either pigskin or cow hide, there has been considerable interest in finding and using alternative substitutes. Hence, extracting gelatin from fish skin as new source of gelatin is highly granted. In this research, two types of marine sources were examined for the highest value of gel strength and viscosity under three mechanical improvement conditions using enzyme transglutaminase, namely, incubation temperature, incubation time, and enzyme concentration. The extracted sample that has excellent gel strength were selected for the optimization of the modification conditions by using Central Composite Design (CCD) by Design Expert v.6.0.8. *Hexanchus griseus* or shark was found to have the highest value of gel strength which are 2.6g. The analysis revealed that the maximum gel strength from gelatin extract of *Hexanchus griseus* skin can be reached with these conditions: 6°C, 24 hr and 0.15mg/ml of enzyme concentration.

Keywords: transglutaminase, mechanical improvement, marine, gel strength, *Hexanchus griseus*

INTRODUCTION

The main concern of this research is to produce halal gelatin from marine sources. This is due to the increasing in the number of usage of non halal sources of gelatin and religious sensitivity. In supporting the issue,the citation from journal is included: The worldwide production of gelatin in 2007 was about 326 000 tons, of which 46% were from pigskin, 29.4% from bovine hides, 23.1% from bones, and 1.5% from other parts (Jamilah and Harvender, 2002). Production of gelatin from pig skins is not acceptable for Judaism and Islam, and gelatin from cattle is acceptable only if it has been prepared according to religious requirements. Therefore, to cater to this market segment, the development of gelatin alternatives is highly desirable to food processors as the global market for foods certified halal is growing very rapidly. With expected