

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 22

EXTRACTION OF FISH COLLAGEN USING ENZYMATIC PROCESS

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ABSTRACT

Gelatin is a high molecular weight polypeptide obtained by partial hydrolysis of a water insoluble fibrous protein collagen. Collagen is the primary protein component of mammalian and fish skins, bones and connective tissues. The properties of gelatin including viscosity, gel strength, gelling and melting temperature will affect the quality of gelatin produced. The type of chemical pre-treatment and parameters of extraction can as well influence the length of polypeptide chains and the functional properties of the gelatin. The thermal shrinkage, denaturation temperature of collagen and melting temperature of gelatins derived from different sources of fish will greatly differ and to some extent limit the application of fish gelatins as compared to mammalian gelatins. With regard to this, the study was carried out to optimize gelatin extraction from four types of local fish; 'Jenahak' (*Lutianus agentimaculatus*), 'Kerapu' (*Epinephelus sexfasciatus*), 'Kerisi' (*Pristipomodes typus*) and 'Kembong' (*Rastrelliger kanagurta*) so as to search for a possibility of shortening the time of extraction and to modify the properties of fish gelatins with the aid of an enzyme; transglutaminase, in order to determine optimum conditions of enzymatic cross-linking of fish gelatins so that the gel could be obtained at room temperature. The physico-chemical characteristics (appearance and odour) including amino acid compositions of each type of fish was also determined. Comparisons of spectra between gelatins of different sources; fish, pork and commercial, were carried out using the FTIR spectroscopy and the differences and similarities in functional groups present were recognized. The results show that by using very small, cut, fish skins, significantly shortens the time of extraction in comparison with extraction methods where whole skins are used. Modification of fish gelatins with transglutaminase were also possible if proper enzyme and substrate concentration are being used.

Keywords: fish gelatin, amino acid composition, enzymatic extraction, marine fish

INTRODUCTION

The most abundant current source of gelatin is from mammals, especially from bovine and porcine. Thus, taking into account the recent sanitary problems by the use of these species, marine gelatin is offered as an alternative to gelatins from land mammals. However, the main