

Comparison between Thermal Hydrolysis and Enzymatic Proteolysis Processes for the Preparation of Tilapia Skin Collagen Hydrolysates

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Abstract

WANG W., LI Z., LIU J.-Z., WANG Y.-J., LIU S.-H., SUN M. (2013): Comparison between thermal hydrolysis and enzymatic proteolysis processes for the preparation of tilapia skin collagen hydrolysates. Czech J. Food Sci., 31: 1–4

The tilapia (*Oreochromis niloticus*) skin hydrolysate was produced by thermal or enzymatic hydrolysis processes. Several product characteristics were studied such as the average molecular weight, 2,2-diphenyl-1-picrylhydrazyl radical-scavenging activity, yield, and protein content, in order to compare thermal hydrolysis and enzymatic proteolysis processes for the hydrolysed tilapia skin collagen production. The effects of the following hydrolysis parameters (retorting time and pH, protease combination, and proteolysis time) were studied. Compared with the thermal hydrolysis process, the enzymatic proteolysis process needed less time and milder conditions, under which hydrolysates could be obtained as low molecular weight antioxidant peptides.

Keywords: fish skin gelatin; hydrolysate; antioxidant activity; autoclaving; proteases

Global production of tilapia is dominated by China. According to China Fishery Yearbook 2010, by 2009 the annual China production of tilapia had risen to nearly 1.25 mill. t and the volume of tilapia processing was 0.59 mill. ton.

Large quantities of fish waste including skins and bones from tilapia fillet processing account for about one half of the unprocessed fish weight. If these collagen-containing wastes are dumped, they may cause pollution and the protein resources are squandered.

Collagen from fish skins can meet religious needs (Jewish or Muslim) and avoid bovine spongiform encephalopathy (BSE) or the foot-and-mouth disease (FMD) in the collagen of land animal origins.

GROSSMAN and BERGMAN (1992) explored the process for the production of gelatin from tilapia skin. JAMILAH and HARVINDER (2002) and ZENG *et al.* (2009) studied the characteristics of gelatin obtained from the skin of tilapia, which manifested that the gelatin from tilapia skins has broad pros-

pects for application. In recent years, numerous studies appeared on hydrolysed fish skin collagen (YANG *et al.* 2008; JIA *et al.* 2010; YIN *et al.* 2010). Hydrolysed collagen of fish origin is currently used in various fields including functional food, beverages, and dietary supplements. Chances are that hydrolysed collagen coming from fish can improve bone metabolism (GUILLERMINEY *et al.* 2010) and prevent skin aging (TANAKA *et al.* 2009).

YANG *et al.* (2009) optimised the process for the production of tilapia retorted skin collagen hydrolysates with antioxidant properties. WASSWA *et al.* (2008) prepared protein hydrolysates from the skin of Nile tilapia hydrolysed with protease, which exhibited satisfactory functional properties required in food processes.

The objective of this study was to compare thermal hydrolysis and enzymatic hydrolysis of tilapia skin collagen in order to introduce a better process for hydrolysed tilapia skin collagen production.

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Table of Contents Comparison Between Thermal Hydrolysis And Enzymatic

1. Understanding the eBook Comparison Between Thermal Hydrolysis And Enzymatic
 - The Rise of Digital Reading Comparison Between Thermal Hydrolysis And Enzymatic
 - Advantages of eBooks Over Traditional Books
2. Identifying Comparison Between Thermal Hydrolysis And Enzymatic
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Comparison Between Thermal Hydrolysis And Enzymatic
 - User-Friendly Interface
4. Exploring eBook Recommendations from Comparison Between Thermal Hydrolysis And Enzymatic
 - Personalized Recommendations
 - Comparison Between Thermal Hydrolysis And Enzymatic User Reviews and Ratings
 - Comparison Between Thermal Hydrolysis And Enzymatic and Bestseller Lists
5. Accessing Comparison Between Thermal Hydrolysis And Enzymatic Free and Paid eBooks
 - Comparison Between Thermal Hydrolysis And Enzymatic Public Domain eBooks
 - Comparison Between Thermal Hydrolysis And Enzymatic eBook Subscription Services
 - Comparison Between Thermal Hydrolysis And Enzymatic Budget-Friendly Options
6. Navigating Comparison Between Thermal Hydrolysis And Enzymatic eBook Formats

- ePub, PDF, MOBI, and More
 - Comparison Between Thermal Hydrolysis And Enzymatic Compatibility with Devices
 - Comparison Between Thermal Hydrolysis And Enzymatic Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Comparison Between Thermal Hydrolysis And Enzymatic
 - Highlighting and Note-Taking Comparison Between Thermal Hydrolysis And Enzymatic
 - Interactive Elements Comparison Between Thermal Hydrolysis And Enzymatic
 8. Staying Engaged with Comparison Between Thermal Hydrolysis And Enzymatic
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Comparison Between Thermal Hydrolysis And Enzymatic
 9. Balancing eBooks and Physical Books Comparison Between Thermal Hydrolysis And Enzymatic
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Comparison Between Thermal Hydrolysis And Enzymatic
 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
 11. Cultivating a Reading Routine Comparison Between Thermal Hydrolysis And Enzymatic
 - Setting Reading Goals Comparison Between Thermal Hydrolysis And Enzymatic
 - Carving Out Dedicated Reading Time
 12. Sourcing Reliable Information of Comparison Between Thermal Hydrolysis And Enzymatic
 - Fact-Checking eBook Content of Comparison Between Thermal Hydrolysis And Enzymatic
 - Distinguishing Credible Sources
 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
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