COMPARISON OF THE FUNCTIONAL PROPERTIES OF HYDROLYSATES PRODUCED FROM CHICKEN EGG SHELL MEMBRANE COLLAGEN CRUDE EXTRACTION EXTRACTED WITH DIFFERENT METHODS

A dissertation submitted to the

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

In partial fulfillment of the requirement of

The degree of

Bachelor of Animal Science

by

KALUDURAGE SULAKSHIKA MADUSHANI DISSANAYAKE

Animal Science Degree Programme

Department of Animal Science

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

2018

ABSTRACT

Collagen is a highly valuable protein used in food industry. Egg shell membrane is a safe source for collagen. Extraction of collagen from chicken membrane and producing its hydrolysates were carried out using different methods. Objective of this study was to extract collagen from chicken egg membrane with simple and non-toxic method followed by hydrolysis to find out the functional properties of the hydrolysates. Shell membrane was separated by manual peeling by adding 0.5 M Acetic acid, 0.5 M Citric acid followed with extraction of collagen with pepsin digestion. pH of the extracted collagen was adjusted to 6.5 and hydrolyzed using protease with different time combinations (0, 3, 6, 9, 12, 24 hours) at 37°C followed by heat inactivation at 100°C for 15min.Best hydrolysates were selected by10% SDS-PAGE Gel electrophoresis by visual observations. Selected hydrolysates were subjected to Anti-bacterial activity, Metal (Fe^{+2}) chelating activity and antioxidant activity by Thiobarbituric Acid Reactive Substances (TBARS) method and Diphenyl-1-picryhydrazyl (DPPH) radical scavenging activity. The highest collagen yield was observed from citric acid (0.15g/10g) extraction than acetic acid (0.08g/10g) treatment ($P>0.05$). SDS-PAGE did not show bands even 0 hours, therefore it was selected for antioxidant testing. In anti-bacterial test it showed inhibition for locally isolated *E.coli* and *Salmonella* with 0.625 ppm minimum concentration. In DPPH analysis, citric acid extraction shows lower scavenging activity (68.12%) than acetic acid (75.53%) ($P>0.05$). However in TBARS method also did not showed significant difference among the treatments ($P>0.05$) and it showed 0.00 mg/l level of Melonaldehyde. Both acetic and citric extractions showed less Fe^{+2} chelating activity around 2% ($P>0.05$). This concludes that collagen hydrolysates showed good antioxidant activity with citric acid extraction than acetic acid extraction comparing with the ascorbic acid as positive control which can be used as a naturalanti-bacterial agent for foods and antioxidant agent in food industry which does not contains iron as Fe^{+2}.

Key words: Collagen, Hydrolysates, Antioxidant activity, Pepsin, Protease