

**DETERMINATION OF THE FUNCTIONAL
PROPERTIES OF PEPTIDE DERIVED FROM
OVALBUMIN INCORPORATED BREAKFAST
CEREAL**

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 Science in Animal Science

by

DEVENI GURUGE KUSALA WATHSANIE

**Department of Animal Science
Faculty of Animal Science and Export Agriculture
Uva Wellassa University**

2017

ABSTRACT

Ovalbumin is the main protein in egg white and its hydrolysates can be used to produce many foods with various functional properties. This study was carried out to determine the functional properties of peptides derived from ovalbumin-incorporated breakfast to increase the nutrition and keeping qualities. Ovalbumin (20 mg/ml) was hydrolyzed with 1% (1:100) of pepsin for 0 hours as a single treatment and 1% of trypsin (37 °C) followed with 1% protease (37 °C) for 3 hours as a combination treatment. The enzymes were heat inactivated at 100 °C for 15 min. Breakfast cereal contained 20% rice, 6.67% corn, 6.67% green grams, 6.67% cow pea, 12% chick pea, 3.34% skim milk powder, 6.67% sugar, 0.67% salt, 0.67% vanilla, and 33.3% water. The mixture was steamed at 100 °C for 40 min and oven dried at 150 °C for 15 min. Treatments were prepared by adding ovalbumin 3.34% (T₁), hydrolysates 3.34% (1% pepsin) (T₂) or hydrolysates 3.34% (1% of trypsin and protease) (T₃) to the cereal formula. Total plate count was used to detect antimicrobial activity. No microbial activity was found in (T₁), (T₂) and (T₃) during the first 2 weeks and the microbial growth after 3rd week was within acceptable level (10 cfu/g). However, no significant difference ($p > 0.05$) was seen in any of the treatments. Keeping quality studies were done with antioxidant activity with TBARS value as the concentration of malanaldehyde (mg/Kg). As with TBARS and pH values, the T₁ and T₂ were within the range of acceptable levels but rate of oxidation in T₃ was increased after 14 days. As with metal-chelating, Fe²⁺ was bound in T₁ and T₂, but not in T₃. Cu²⁺ was not bound in any treatments and releasing of bound Cu²⁺ to the solution was observed. In conclusion, hydrolysates from 1% (1:100) pepsin can be a good replacer for the synthetic materials in breakfast cereals since it has several functional activities.

Keywords: Breakfast cereal, Hydrolyzed ovalbumin, Antimicrobial, Antioxidant, Metal-chelating