

EFFECT OF ELECTRIC FIELD ON COAGULATION OF  
AND RELATION OF COAGULATION FROM  
PROTEIN PROCESSING IN STEAM  
ELECTRIC PRECIPITATION

MUMDAH BINTI MUSTARI

FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU

2012



EFFECT OF TITANIUM DIOXIDE ON COLOR, TEXTURE, AND GELATION OF  
PROTEIN RECOVERED FROM OTOSHIMI PROCESSING WASTE  
USING ISOELECTRIC PRECIPITATION.

By

Munirah Binti Mustapa

Research Report submitted in partial fulfillment of  
the requirement for the degree of  
Bachelor of Food Science (Food Technology)

DEPARTMENT OF FOOD SCIENCE  
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU  
2011

## ENDORSEMENT

The project report entitled **Effect Of Titanium Dioxide On Color, Texture, And Gelation of Protein Recovered From Otoshimi Processing Waste Using Isoelectric Precipitation** by **Munirah Binti Mustapa**, Matric No. **UK16959** has been reviewed and corrections have been made according to the recommendations by examiners. This report is submitted to the Department of Food Science Faculty in partial fulfillment of the requirement of the degree of Bachelor of Food Science (Food Technology), Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu.

  
**NIZAHA JUHAIDA MOHAMAD**  
Lecturer  
Department of Food Science  
Faculty of Agrotechnology and Food Science  
Universiti Malaysia Terengganu  
21030 Kuala Terengganu.


.....  
(NIZAHA JUHAIDA BINTI MOHAMAD)

Main supervisor

Date :

## DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

Signature : .....  .....

Name : MUNIRAH BINTI MUSTAPA.

Matric No. : UK16959

Date : ..... 9 / 2 / 12 .....

## **ACKNOWLEDGEMENT**

Appreciation is expressed to the following individuals for their kindness in guiding, supporting, and encouraging me to finish my project. First of all, I would like to extend my greatest thanks to my main supervisor, Madam Nizaha Juhaida Binti Mohamad for her meritorious advice, guidance and encouraging support during the research project. Her patience and enthusiasm on students facing difficulty and problem make a lasting impression on me. My special thanks also give the help and cooperation of all fellow friends and skilled technical assistance will be remembered always. Last but not least, my beloved parents deserve thanks for their never-ending support and encouragement throughout my whole studies.

## ABSTRACT

Whiteness is a critical attribute for restructured fish products such as surimi seafood. However, the whiteness of gels made from proteins recovered from otoshimi processing waste from isoelectric solubilization precipitation is poor. The by-products or waste contain bones, scales, skin, etc. that affect gel color. Therefore, whiteness needs to be improved if marketable products are to be developed from recovered proteins. The objectives of this study were to determine effects of titanium dioxide ( $\text{TiO}_2$ ) on color, texture and gelation of gels made from isolated proteins from waste of otoshimi. Protein from waste of otoshimi were recovered with isoelectric solubilization precipitation.  $\text{TiO}_2$  was added to protein paste at 0.0–0.5 g/100 g.  $\text{TiO}_2$  at concentration 0.5g/100g resulted in better whiteness of protein gels than commercial surimi gels. But the texture properties of protein gels with addition of  $\text{TiO}_2$  was poor as compared to commercial surimi gel. This research demonstrates that whiteness of restructured fish products based on proteins recovered from otoshimi processing waste by isoelectric solubilization precipitation was comparable with the whiteness of commercial surimi.

## ABSTRAK

Warna putih merupakan ciri-ciri yang penting dan kritikal bagi produk berasaskan ikan seperti surimi. Walau bagaimanapun, gel protein daripada sisa-sisa pemprosesan otoshimi yang melalui proses *isoelectric solubilization/precipitation* (ISP) mempunyai kualiti warna putih yang sangat rendah. Ini kerana sisa-sisa pemprosesan otoshimi ini mengandungi tulang, kulit dan sisik yang mempengaruhi warna pada gel protein tersebut. Oleh itu, kualiti warna putih gel protein tersebut perlu diperbaiki supaya produk yang berasaskan daripada sisa-sisa pemprosesan otoshimi ini dapat dipasarkan. Objektif bagi kajian ini adalah untuk melihat kesan titanium dioksida ( $\text{TiO}_2$ ) ke atas warna, tekstur dan pembentukan gel pada protein yang diasingkan daripada sisa-sisa pemprosesan otoshimi setelah melalui proses ISP.  $\text{TiO}_2$  telah ditambahkan ke dalam protein yang telah melalui proses ISP pada kepekatan 0.0 – 0.5%.  $\text{TiO}_2$  pada kepekatan 0.5% menunjukkan warna putih yang lebih baik berbanding surimi komersial. Tetapi kualiti tekstur gel protein pada kepekatan 0.5% ini adalah rendah berbanding surimi komersial. Kajian ini menunjukkan produk ikan yang berasaskan daripada sisa-sisa pemprosesan otoshimi yang telah melalui proses ISP mempunyai warna putih yang lebih baik berbanding komersial surimi.