

12.pdf

by

Submission date: 07-Jan-2022 01:13PM (UTC+0700)

Submission ID: 1738410165

File name: 12.pdf (309.73K)

Word count: 2005

Character count: 10598

PAPER · OPEN ACCESS

Premix Flour for Preparation of Empek-Empek Based on Surimi Technology

To cite this article: AB Tawali *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **355** 012079

View [the article online](#) for updates and enhancements.

You may also like

- 2**
- [Effect of different types of phosphorylating reagent on the synthesis of modified tapioca starch](#)
A K Sugih, L Christabella, H Kristianto *et al*
- 5**
- [Premix formulation for making the Indonesian otak-otak](#)
A B Tawali, N Wakiah, A R Ramli *et al*.
- 2**
- [Some physicochemical properties of tapioca starch during infrared heat treatment](#)
P Uraives and P Choomjaihan

Premix Flour for Preparation of Empek-Empek Based on Surimi Technology

AB Tawali¹, S Manggabarani², AR Ramli¹, S Sirajuddin³, S Made⁴ and M Mahendradatta¹

¹Department of Food Science and Technology, Hasanuddin University, Indonesia

²Department ⁶ Nutrition, Health Institute of Helvetia, Indonesia

³Department of Public Health, Hasanuddin University, Indonesia

⁴Department of Marine Science and Fisheries, Hasanuddin University, Indonesia ⁹

E-mail: andi.rahmayanti28@gmail.com

Abstract. Empek-empek is one of signatred food from Indonesia which made from fish paste, tapioca starch, and other additional ingredients. The objective of this present work was to develop premix flour for making empek-empek using mackerel surimi and to evaluate their chemical characteristic and sensory attributes of the product. The mackerel fish was made into surimi, powdered, then mixed with tapioca starch and other additional ingredients. The following aspect were characterized including moisture, fat, protein, ash, carbohydrate content, and sensory acceptability of the premix product. The results showed that mackerel surimi flour at level of 66,67% is the recommended formula. The empek-empek which made from this premix flour presented hedonic score “like” for color and “like moderately” for aroma, texture and flavor. In conclusion, our premix can be used for preparing empek-empek with less complicated process and the product did not have any negative results on sensory acceptability.

1. Introduction

Surimi refers to a fish protein product consisting primarily of the ⁴myofibrillar protein fraction from one or more fish species. Surimi is made from minced fish that has been washed to remove fat and undesirable substances (such as blood, pigments, and odorous substances), and then mixed with cryoprotectants (such as sugar or sorbitol) to improve its frozen shelf life [1].

Indonesia has a potential resource from marine because the geographical condition that is surrounded by the sea. One of the most potential marine resources is fish. Based on the statistic data, Indonesia has reached 295239.20 tonnes when it comes to fish production [2]. Empek-empek is one of popular fish-based product in Indonesia.

Empek-empek is an indigeneous food from Indonesia, which served with sweet and sour sauce. This product is made from fish paste, tapioca starch, and spices. Empek-empek has a sharp flavor that comes from its main ingredients, the fish paste. Commonly, mackerel fish is used in empek-empek production because it has a good quality to forming a gel. The preparation of empek-empek takes a quite long time. On the other hand, the availability and quality of the product were a problem that



¹Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

often occur in empek-empek production. Therefore, premix technology can be an one of the alternative solution In addition, the availability of raw mackerel is not always available in and product quality were also a problem in empek-empek production.

Premix is a mixture of several different types of flour [3]. The purpose of the premix technology itself is to make a product with balanced formula that is easy to use and has a long shelf life. In this present study, we aimed to develop premix for making traditional food “Empek-empek” using mackerel surimi and to evaluate their chemical characteristic and sensory attributes of the product.

2. Materials and Methods

2.1 Mackerel surimi powder preparation

The mackerel fish was cleaned from skin, bones, fins, and gill. The meat fish was washed with running water then minced into fish paste. The fish paste was leached with 0.3% NaCl solution with ratio of 1:4 (w/v) for 15 minutes at 5-10 °C. The leaching process was repeated for four times then filtered using filtered cloth. The surimi was dried using blower for 12 hours at 65°C until the water content reach 4%. The dried surimi then grinded using grinder and sieved using a 100-mesh sieve.

2.2 Premix preparation

Two premixes were formulated by mixing the ingredients in the following proportions. The formula of two premixes could be seen in table 1.

Table 1. Ratio of surimi powder, tapioca flour, and spices of premix formulas

Material	Formula (%)	
	Premix I	Premix II
Tapioca flour	16.67	41.67
Surimi powder	66.67	41.67
Wheat flour	13.33	13.33
Salt	1.33	1.33
Garlic powder	1	1
Flavor enhancer	1	1

2.3 Empek-empek preparation

The empek-empek was made by kneading the formulated premixes and cold water (2:4) into dough. The dough was formed into oval shape, then boiled for 20-25 minutes at 100°C. Freshly prepared empek-empek was subjected to sensory and chemical analysis.

2.4 Sensory Analysis

Sensory analysis are important equal as physical measurements, especially when developing new products. The empek-empek premix product were subjected to sensory analysis for the attributes of appearance, aroma, texture and taste using Hedonic Scale Scoring [4]. The scoring scale used between 1-5 with the scores representing the hedonic attributes of 5,4,3,2,1 were “like very much”; “like”; “like moderately”; “dislike”; “dislike very much”, respectively. The samples were tested by 30 panelist. The analysis of empek-empek from premix formula was done on three different days. The samples were presented under white light at room temperature and members were asked to sip water in between to minimize the possibility of carry over taste, if any. No accompaniment was given with samples.

2.5 Chemical Analysis

The chemical compounds of the empek-empek premix best formula was measured using AOAC methods [5] with three replications for each parameter. Ash content was measured by weighing and

furnace methods at 600°C for 3-5 h (AOAC method 942.05, 4.1.10). The protein content was measured using kjeldahl distillation and the nitrogen value was converted to protein value using conversion factors (AOAC method 960.52, 12.1.07). Oven drying and weighing methods (AOAC method 926.12, 41.1.02) were used to measure the moisture content. Fat extraction using sohxlet distillation and chloroform as a solvent was used to measure the fat content (AOAC method 948.22, 40.1.05). The carbohydrate content was measured by difference method.

3. Result and Discussion

3.1 Sensory analysis

Organoleptic test is a test which carried out by using human senses through sensory stimulation. This test is performed on samples empek-empek to determine the best formulation of ¹⁰ mix for making empek-empek. The number of panelists who participated were 30. The results are summarized in table 2.

Table 2. Sensory analysis of empek-empek that prepared from premix formula

Formulation	Color	Aroma	Flavor	Texture
Premix I	4.07	3.90	3.88	3.94
Premix II	2.91	3.07	3.44	2.06

The quality of food products generally depends on several factors. Color is one of the attributes that often determine the level of consumer acceptance of the product as a whole. The natural color of empek-empek is gray and the gray color was caused by gelatinization reaction.

Hedonic test showed that premix I formula presented hedonic score “like” color and “like moderately for aroma, texture and flavor, while the premix II formula presented “like moderately” only on flavor and aroma attributes. The texture and color of premix II formula showed hedonic score “dislike”. This may have been due to the ingredients which are used, such as tapioca starch. The texture of empek-empek tend to decrease with the decreasing of surimi powdered concentrations. This shows that this is related to the ability of surimi powder to form a gel that is sufficiently robust and transparent strongly supported as a component of the filler and adhesive. So that when the amount of surimi powder in the dough-empek empek reduced, the texture will decrease.

3.2 Chemical composition of premixes

The moisture content of the premix was 11.45%. Those indicated that our products does not meet the SNI requirements. The standard of the premix flour refers to the standard of the fish flour. According to the SNI number 01-3709-1995 [6], the water content of the fish flour is maximum of 10%. Drying process of the mackerel surimi and other dried materials which used were the determinant factors of the moisture content of the premix flour.

Table 3. Chemical composition of Premix-I formula

Contituents	Quantity (%)
Moisture	11.45
Ash	2.65
Protein	17.63
Fat	1.72
Carbohydrate	66.55

The ash content contained in empek-empek of flour premix of 1.60%. The ash content of meat is closely linked to its water content and protein content on a fat-free tissue. Insoluble minerals associated with proteins for minerals mainly associated with the non-fat part, lean meats often contain

high mineral or ash, in general has met the SNI for fish balls ash content, this is because the ash content of flour empek-empek premix is less than 3%, while the ash content at a maximum of 3% fish balls [7]. The protein content of the premix-I formula was high at 17.63% which contributed by mackerel surimi powder which has high level of protein. Mackerel fish has high protein content and low fat. The fat content that contained in premix-I formula was 1.72%.

Carbohydrate levels in Premix-I formula was 66.55%. Carbohydrate levels in premix-I formula can be influenced by the concentrations of tapioca flour. The carbohydrate content is also can be influenced by other components such as water, protein, ash and fat because of the *by different* used methods.

4. Conclusion

In conclusion, the mackerel surimi flour at level of 66.67% is the recommended formula to be used in making empek-empek from premix. The empek-empek which made from this premix presented hedonic score "like" for color and "like moderately" for aroma, texture and flavor. Therefore, our premix can be used for preparing empek-empek with less complicated process and the product didn't have any negative impact on sensory acceptability.

5. References

- [1] FDA 2014 CPG Sec. 540.700 Labeling of processed and blended seafood products made primarily with fish protein U.S. Department of Health and Human Services Food and Drug Administration
- [2] Statistics Indonesia 2016 Fish production data <https://www.bps.go.id/linkTabelStatis/view/id/1705>
- [3] Santoso J 2009 Perubahan karakteristik surimi selama proses penyimpanan beku *Food review Indonesia*. 5 (8) 36-40
- [4] Larmond E 1977 Laboratory methods for sensory evaluation of food (Ottawa: Research Institute Canada Department of Agriculture Ottawa)
- [5] AOAC 2005 Determination of moisture, ash, protein and fat Official Methods of Analysis 18th edn (Washington DC: Association of Official Analytical Chemist Washington DC)
- [6] SNI National Standardization Agency of Indonesia <http://sisni.bsn.go.id/>
- [7] Badan Standardisasi Nasional 1995 Bakso Ikan SNI 01-3819-1995 (Jakarta: BSN)

ORIGINALITY REPORT

13%

SIMILARITY INDEX

11%

INTERNET SOURCES

11%

PUBLICATIONS

6%

STUDENT PAPERS

PRIMARY SOURCES

1	ikee.lib.auth.gr Internet Source	3%
2	I Risnasari, A Nuryawan, Delvian, Y S K Sekali. "Use of biopolybag from tapioca starch and sawdust waste", IOP Conference Series: Earth and Environmental Science, 2021 Publication	2%
3	cyberleninka.org Internet Source	2%
4	www.st.nmfs.noaa.gov Internet Source	1%
5	W J Supriadi, I Amal, J Mustabi, J A Syamsu, M F Latief. "Relationship between pellet durability index and hardness of pellet with various binder for broiler finisher phase", IOP Conference Series: Earth and Environmental Science, 2021 Publication	1%
6	Owildan Wisudawan B., Anwar Mallongi, Syamsiar S. Russeng, Muh Hatta, Anwar Daud,	1%

Muhamad Subhan. "Bioaerosol pollution in intensive-care unit of Dr. Wahidin Sudirohusodo Hospital Makassar: Morning and midday assessment", Enfermería Clínica, 2020

Publication

7 Submitted to University of Lancaster 1 %
Student Paper

8 Laksmi Putri Ayuningtyas, Ashri Mukti Benita, Desy Triastuti. "Functional properties of hydrothermally modified lesser yam (*Dioscorea esculenta*) starch", IOP Conference Series: Earth and Environmental Science, 2021 1 %
Publication

9 dl.icdst.org <1 %
Internet Source

10 www.biotechduediligence.com <1 %
Internet Source

Exclude quotes On

Exclude matches < 5 words

Exclude bibliography On