THE STUDY OF TOFU NUGGETS FORTIFIED WITH CATFISH (*Pangasius hypopthalmus)* PROTEIN CONCENTRATES

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Abstrack

Nuggets fortified with Catfish (*Pangasius hypopthalmus)* was introduced to increase its economical value. Tofu was applied as a subsituent material to make nuggets. The aim of this study was to determine quality of tofu nuggets fortified with different concentrations of Catfish Protein Concentrates. Completely Random Design non factorial with three levels treatment of Catfish Protein Concentrates (0 %, 5 %, and 10 % from tofu weight) and three repetations were used. The results show that there was interaction between treatments of different level concentrations of Catfish Protein Concentrates to the proximate analyze and preference test of organoleptics on tofu nuggets. The best treatment of tofu nuggets was in 5 % of Catfish Protein Concentrates which contains water contents of 52,98 % and protein of 16,70 %, while organoleptic test showed that generally the panelists like flavor, texture, appearance and odor of the tofu nuggets fortified with Catfish Protein Concentrates, as many as 70, 75, 75, and 75 people, respectively.

Keywords: Fish Protein Concentrate, tofu nuggets and catfish

1. INTRODUCTION

Fortification is defined as adding of nutrition materials/subtansces into foods. The nutrition substances that always added into the food consist of proteins, vitamins, and minerals. Fortification of food aims to enhance consumption level of nutrition substances in the added food to increase nutrition status of population and to prevent nutrition deficiency and its effects.

The fisheries resources are potential of food sources that need to be managed. The potency of them should be in line with the development of processing technology in order to increase economical value and production of the fisheries products. The way to develop the fisheries products is by use fortification and diversification of fisheries processing products as an effort to diverse food source from fisheries.

Catfish (*Pangasius hypopthalmus*) is one of freshwater fish that well known in Indonesia. It owns economical value and tasteful of fish meat, so catfish stays in high demand.

Fortified fisheries processing products are expected to bring a good choice of food to people so that there are a lot of alternative ways to consume the fish. Fortification products are defined as an alternative way to enrichment of processing product from fisheries. One example of fortification product is adding of fish protein concentrate (FPC) into another product such as tofu nuggets.

Nutrient content in tofu is still less than nutrient content in the food from animals dishes (www.nasional.kompas.com). Therefore, the fortification of FPC into tofu nuggets is required to supply protein content from tofu. As the results of previous studies, FPC of

Catfish contained protein level of 75.31% (Dewita and Syahrul, 2010) so that through fortified tofu nuggets with FPC of Catfish, it will be generated qualified food since its contains amino acids that required by human body.

2. MATERIALS AND METHOD

MATERIALS

The main raw material used in the study is catfish (*Pangasius hypopthalmus*) and materials for nuggets production as well as chemicals used for the extraction of fat in the production of FPC and proximate analysis

The tools used in the study to process FPC are analytical balance, table balance, food processor, heater, magnetic stirrer, refrigerator, filtering, cabinet dryer, dry blender, and sieve with size of 60 mesh. The tools for analysis are analytical balance, desiccators, muffle, oven, ash, crusible, evaporating disk, bench scale and kjedhal equipments.

METHOD

Experimental method was employed in this study which is experiment of production on fortified tofu nuggets with catfish protein concentrate. Completely Random Designed (CDR) non factorial with nine units of treatments that consists of three levels treatment namely addition of 0% (K_0), 5% (K_1), and 10% (K_2) per tofu weight of catfish protein concentrate was applied with three replications. The parameters were confirmed as a preference test by organoleptic tes (flavor, texture, appearance and odor) on fortified tofu nuggets with catfish protein concentrate. Moreover, proximate analysis was conducted to determine water, protein, fat and ash content in fortified product.

The production of fortified tofu nuggets with catfish protein concentrate was presented as follows : Tofu was crushed, mixed and added by fine seasoning, yolk, Fish Protein Concentrate, tapioca flour into dough. Furthermore, The dough was steam during 30 minutes until it cooked completely. After it was cooled, the cooked dough was cut according to desired size (in this study the size is 3 cm of length, 3 cm of width and 3 cm of thickness). Then, each pieces were dipped into butter (mixture of 20 ml of water and 20 g of maizena flour) and rolled in bread crumb. Finally, fortified tofu nuggets with catfish protein concentrate should be stored in low temperature or directly consumed by fried with hot oil. In details, procedures of fortified tofu nuggets with catfish protein concentrate was listed in following flow chart.

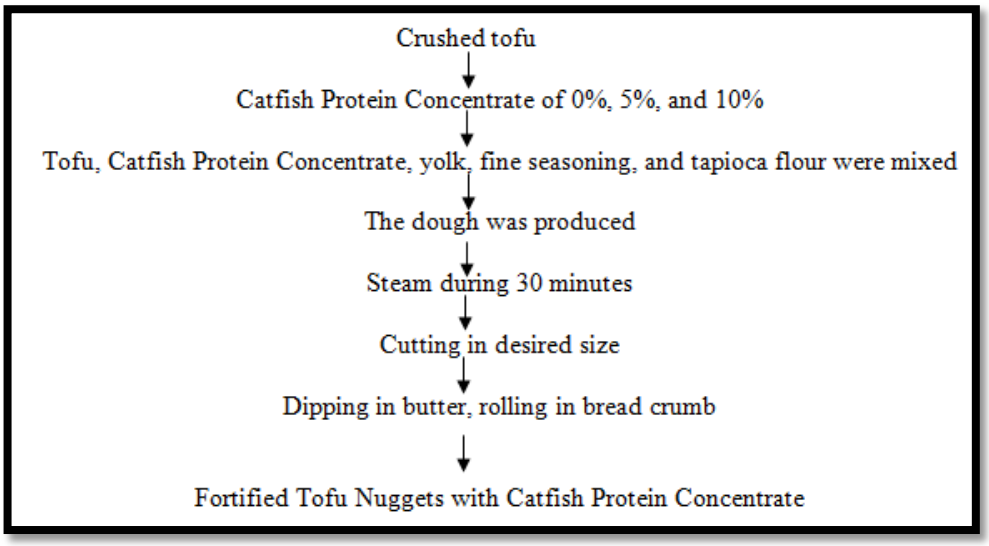

Figure 1. Flow chart of Fortified Tofu Nuggets with Catfish Protein Concentrate

Data Analysis

The obtained data was tabulated into tables, graphs, figures and schemes and then analyzed statistically by using ANOVA and continued by Least Significance Difference test.

3. RESULTS

Organoleptics Results

Results of preference test by using organoleptics test (flavor, texture, appearance and odor) on fortified tofu nuggets with catfish protein concentrate that involved 80 of panelists can be seen in Table 1.

Table 1. Average number of panelists in preference test by using organoleptics test on fortified tofu nuggets with catfish protein concentrate

Preference	Organoleptics Results											
	Flavor			Texture			Appearance			Odor		
	K_0	K_1	K_2	K_0	K_1	K_2	K_0	K_1	K_2	K_0	K_1	K_2
Like very much	22	22	16	14	24	17	14	20	15	19	21	21
Like	49	52	44	60	51	55	59	55	55	53	54	50
Dislike	9	6	18	5	4	8	6	4	9	8	5	9
Dislike very much	0	0	2	1	1	0	1	1	1	0	0	0

In Table 1, it can be seen that preference test by using organoleptics generate panelists who are like fortified tofu nuggets with catfish protein concentrate generally. The number of panelists who like the flavor of fortified tofu nuggets with catfish protein concentrate as many as 74 people, 75 panelists who like texture of fortified tofu nuggets with catfish protein concentrate, and 75 panelists who like odor of fortified tofu nuggets with catfish protein concentrate for addiction 5 % of catfish protein concentrate treatment. Hence, the preference test through organoleptics shows that the panelists prefer fortified tofu nuggets with treatment of K_1 (addiction of 5% catfish protein concentrate).

Proximate Analysis

The measurement of water content in food materials is very important. Level of water contents will determine quality of food products including fortified tofu nuggets with catfish protein concentrate. The average of water content in fortified tofu nuggets with catfish protein concentrate is presented in Table 2.

Table 2. Proximate analysis of fortified tofu nuggets with catfish protein concentrate

Proximate Analysis	Average Number		
	K_0	K_1	K_2
Water (%)	62.77	52,98	53.82
Fat (%)	2.64	2,35	2,46
Protein (%)	7.72	16,70	17,09
Ash (%)	2.35	2.42	2.64

Based on Table 2, it can conclude that water contents in the fortified tofu nuggets with catfish protein concentrate fall in the range of 52.98 %- 62.77 %, while protein contents reach between 7,72 % - 17,09 %; and fat contents determine between 2,35 % - 2,64 %,. However, ash contents fall in the range of 2,35 % - 2,64 %. Therefore, nutrition levels that are found in K_1 treatment support the assessment of organoleptics test. It can be conclude that the best treatment in this study is fortified tofu nuggets with catfish protein concentrate of 5 %.

4. DISCUSSION

Products of fortified tofu nuggets with catfish protein concentrate were examined their quality by conducted proximate compositions (protein, fat, ash and water content) and organoleptics test (flavor, texture, appearance, and odor). Chemical analysis were aimed to determine nutrition level of food production. The nutrition level defined as one of factors that affect quality of the food. However, organoleptics test was emphasized on consumer acceptable level on the tested food products.

The results study shows that proximate composition of fortified tofu nuggets with catfish protein concentrate of 5 % and 10 % is relatively equal, except for the control treatment (No addiction of catfish protein concentrate). According to SNI requirements, The products in this study fulfill the requirements both organoleptics properties and proximate analysis.

5. CONCLUSION AND SUGGESTION

Conclusion

Based on preference test by using organoleptics and proximate analysis, it concludes that fortified tofu nuggets with catfish protein concentrate of 5 % (K_1) is defined as best treatment with the results of preference test as many as 88.75 %. It also contain water, protein, fat, and ash as many as 52,98 %, 16,70 %, 2,35 % dan 2.42%, respectively.

Suggestion

As a follow up of the results of this study, it needs to determine shelf life of fortified tofu nuggets with catfish protein concentrate of 5 %.

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