

CHAPTER I

INTRODUCTION

1.1 Background

According to the National Standardization Agency (2012) Indonesia was the country's largest soybean producer in Asia. Soybean production divided by the percentage of distribution of 90% of soybean used to produce soybean, 40% for tahu, 10% for other products such as tauco, soy sauce, and others. Tempeh is a traditional food typical of Indonesia. Tempeh is a food made from soy beans or other ingredients tempeh fermented with yeast. Tempeh is fermented using *Rhizopus fungus oligosporus* (Siregar, *et al.*, 2016). Tempeh is very easy to find in Indonesia, but it is often said to be a cheap meal when tempeh contains elements that are good for the body because contain of fatty acids, vitamins, minerals, antioxidants. In 100g of tempeh contained 20.8 g protein, 13.5g carbohydrates, 8.8 g fat, 4 mg of iron (BSN, 2012),

Iron is the most commonly micro minerals found in human and animal bodies(Almatsier, 2010), Iron amounted to about 0.1% of the mineral elements in the body, and the total amount of iron in the adult human body is about 4 g (Lean, 2013). Iron in the body can be combined with a protein that is able to receive and release oxygen and carbon dioxide. The amount of iron in the body varies according to age, sex, nutritional status, and the amount of iron reserves (Darawati, 2014).

Based on several clinical studies, quality of nutritional value of soy increased during the fermentation process so easy in absorption and digestibility. Vitamin B12 and folic acid also increased and contain phytase enzyme involved in the degradation of phytic acid. Phytic acid is an inhibitor of iron and Zn, so soybean consumption may prevent anemia in someone (Kurnia, *et al.*, 2010).

Nugget is a famous food especially Indonesia and widely available in minimarkets and supermarkets, but the nuggets are often encountered imade from chicken and fish while tempeh as raw materials has not been encountered in the market. Nugget is one of the fast food products well known to the public various groups, especially children and adolescents. Binder used for the adhesive material is flour. Flour used as an adhesive for the content of amylose starch contains fractions which instrumental and bind water molecules and form a gel stability(Syamsudin & Caronge, 2015).

Flour used in the processing of the nugget is wheat flour and tapioca flour. Tapioca flour and wheat flour is a source of carbohydrates which serves as a binder, so the material can be bonded with the other ingredients in the dough well (Permatasari & Rahayuni, 2012).

Red bean is a kind of nuts with good production in Indonesia. Based on data from the (BPS, 2018) red bean production in Indonesia reached 13.596 tonnes in 2017. The red beans are commonly used as a complement to the manufacture of pulp, soup, compote, and mix in processing vegetables, mixed salads, and cakes (Tarin, et al., 2015). Red bean flour used as a protein source. Red bean are a good source of complex carbohydrates, fiber, B vitamins, especially folic acid and vitamin B1, calcium, phosphorus, iron and protein. Each gram of dried red beans that have been boiled can provide protein by 19% and 21% of the RDA protein is recommended for males 20-45 years, in addition red beans also accounts for having folic acid by 75% and 85% of the RDA recommended for men and women aged 20-45 years (Siregar, et al., 2016). Red bean contain lectin, (Lean, 2013).

Lack of information about the making and characteristic red bean flour in Indonesia make an application in the manufacture of food products has not been optimized (Pangastuti, et al., 2013). Based on the above presentation, the author intends to examine Tempeh Nuggets With Red Bean Flour Substitution As Iron Rich Food .

1.2 Formulation of the problem

- 1.2.1 Is there any red bean flour substitution effect towards tempeh nuggets as an iron-rich foods.

1.3 Research purposes

1.3.1 General purpose

- a. Analyzing the effect of red bean flour substitution against tempeh nuggets as an iron-rich food.

1.3.2 Special purpose

- a. Analyzing the nature of the hedonic and hedonic quality tempeh nuggets with red bean flour substitution.
- b. Proximate analyzes the levels of tempeh nuggets with red bean flour substitution.
- c. Analyzing the iron content in tempeh nuggets with red bean flour substitution.

1.4 Benefits of Research

1.4.1 For Respondents

Provide relevant information to the respondent as an alternative food tempeh nuggets patients with anemia, and related information processing variations nuggets.

1.4.2 For educational institutions

Enriching nutritional assessment in terms of food production and food technology related resources.

1.5 Authenticity of Research

Table 1. Authenticity of Research

No.	Title Research	Variables and Design	Research result	Difference
1	Fe and Zn fortification effect on biscuits prepared from a combination of soybean and rice bran to increase levels of albumin toddler nutrition and anemia kuarng (Kurnia, et al., 2010)	Variable: fortification Fe and Zn, tempeh, rice bran, albumin Design: quasi-experimental with pre - post test	There was an increased intake of energy, protein and albumin levels with a p-value 0.005	Variable: Nugget tempeh, red bean flour, iron Design: experimental

2	Effectiveness of soybean tempeh nuggets consumption to weight gain stunting (Mariam, et al., 2017)	Design: quasi-experimental with pre-post test The dependent variable: weight gain toddler The independent variables: the consumption of tempeh soy nuggets	Consumption of soy tempeh nuggets effective against weight gain stunting with a p-value of 0.000	Design: Experimental Variable: red bean flour, iron
3	Test acceptability and nutritional value of biscuits modified with red bean flour (Fatimah, et al., 2014)	Design: experimental study Variable: acceptance, the nutritional value of the biscuits, red bean flour	The addition of red bean flour in the manufacture of biscuits gave increasing amounts of protein and fiber on biscuits with p value 0.000	Variable: Nugget tempeh

4	Received power catfish nuggets that utilize red bean flour and nutritional content (Tarin, et al., 2015)	Design: experimental Variable: Nugget catfish, red bean flour, nutrient content	The more the concentration of red bean flour criteria increasingly unpopular color, taste, texture Nugget catfish by panelists with p value 0.001	Variable: Nugget tempeh, iron
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