

CHAPTER II

LITERATURE REVIEW

2.1 Definition of Food Diversification

Food diversification has various definitions. According to Riyadi (2003), diversification is an election process food that is not only dependent on one type of food, but has a variety of options (alternate) to a variety of foodstuffs.

While according to Suharjo (1998), mentioned that basically diversification includes three interrelated scope of understanding, namely food consumption diversification, diversification of food availability and diversification of food production.

According to Pakpahan and Suhartini (1989), define the concept of diversification is limited only staple food, so that diversification of food consumption is defined as a reduction in rice consumption is compensated by the addition of food consumption of non-rice.

While, Soetrisno (1998) defines a narrower diversification (in the context of food consumption) is an effort to diversify the type of food consumed, includes food sources of energy and nutrients, thus meeting the needs of food and nutrition in accordance with good sufficiency in terms of quantity and quality.

2.2 Materials for Making Breadfruit Cookies

The materials used for the manufacture of cookies is the main raw materials such as wheat flour and soft supporting materials such as sugar (to some extent), starch (corn starch, wheat, tapioca and so on), egg yolks, materials developers and shortening and emulsifier (Matz, 1972). In making formula, the basic ingredients of this group must be balanced, so that the resulting cookies are not too hard or too brittle or crispy (Husain, 1993).

2.2.1 Breadfruit

According to Dayan (2013), breadfruit is a *Artocarpus* genus of plants in the family Moraceae. Monoecious with male and female flowers growing on the same tree. This plant came from New Guinea, Pacific, and developed to Malaysia to Indonesia. Breadfruit plants can be classified into the seeded breadfruit called breadnut and the seedless breadfruit called breadfruit.

Breadfruit round or oval, with light green skin until golden brown. According to Fatmawati (2012), fruit flesh of breadfruit is fine fibrous, texture of breadfruit when raw is hard and be soft sintered after being cooked. Flavor of breadfruit when raw has bland taste and after mature has very sweet taste with aroma/flavor specific.

Young breadfruit rough skinned and old breadfruit smooth skinned (Suprapti, 2002, p,45). Based on types of breadfruit, fruit flesh has white skin, cream skin, yellow skin, and green skin. According to Supriyono (2010), breadfruit has three types are small breadfruit (yellow breadfruit), bald breadfruit, and median breadfruit.

1. Small Breadfruit (Yellow Breadfruit)

The hallmark of this breadfruit is spiny skin soft, small breadfruit is green when it was young and it will become yellow when it was old. Small breadfruit has not much water content, but it has good storage between 8 days after plucking. Fruit fleshs are dry, chewy and good taste. Fruit weight is between 1-1.5 kg.

2. Bald Breadfruit

Characteristics of this type are the breadfruit skin tend to smooth and hairless. Bald breadfruit is green and has much water content. Bald breadfruit has good storage for about 3-4 days. Weight of fruit is between 2-3,5 kg.

3. Median Breadfruit

Median Breadfruit is a cross between bald breadfruit with small breadfruit, its nature is a transition between breadfruit two types them. Fruit skin stands like jackfruit. Fruit flesh tends to chewy and the water

content is lower than bald breadfruit but higher than yellow breadfruit.

Median breadfruit has good storage for about 6 days.

As for the nutrients composition of young breadfruit and old breadfruit can be seen in the table below:

Per 100 gram	Young Breadfruit	Old Breadfruit
Energy (calory)	46	108
Water (g)	87,1	69,3
Protein (g)	2,0	1,3
Fat (g)	0,7	0,3
Cabrohydrate (g)	9,2	28,2
Fiber (g)	2,2	-
Ash (g)	1,0	0,9
Calsium (mg)	59	21
Fosfor (mg)	46	59
Iron (mg)	-	0,4
Vitamin B1 (mg)	0,12	0,12
Vitamin B2 (mg)	0,06	0,06
Vitamin C (mg)	21	17

Table 2.2.1. Nutrients of Breadfruit per 100 gram

Source: Supriyono (2010)

2.2.2 Wheat Flour

Wheat flour is flour or fine powder derived from grain, and used as a base material maker of cakes, noodles and bread. Function of wheat flour are building the framework of cake flour, binding the other ingredients, and getting a good cake texture. Wheat flour contains a lot of starch are carbohydrates and proteins that play a role in determining the form of gluten elasticity foods made from wheat. According to Hamidah (1996, p,39), wheat flour has three types are high protein flour (hard flour), medium flour, and low protein flour (soft flour).

1. High Protein Flour (Hard Flour)

High protein flour is wheat flour containing high protein content, between 11%-13%, is used as an ingredient in bread, noodles, pastam and donuts.

2. Medium Flour

Medium flour is a flour that has a protein content of 10-11%. Wheat flour is gluten properties being. Typically used for domestic purposes, noodle-making, and other.

3. Low-Protein Flour (Soft Flour)

Low protein flour is a wheat flour has a protein content only 8-9%. This flour has less gluten content of both so suitable for use in the manufacture of cakes, biscuits and cookies because it does not require the formation of gluten. Typically used for making cake and cookies.

2.2.3 Fat

The function of fat are keeping the cake for durability, adding nutritional value, giving flavor to the cake, and making a cake feels soft. Fat also serves as emulsifier which will produce a crispy cookie. There are 2 kinds of fat that can be used is butter (fat cow's milk) or margarine (vegetable fat/plant). According to Angscookies (2012), butter and margarine can be used simultaneously in a dry cookie dough with the composition of 1:1 or 1:2. Cookies should be cooked using butter to produce savory flavors and soft and gives a delicious aroma.

2.2.4 Sugar

According to Lekker (2011), function of sugar are giving sweetness, giving color to the skin cake, helping to soft the cake, moistening the cake, and relaxing the dough. The amount of sugar and good quality will affect the texture, appearance and taste of the final product. Generally, sugar is often used for cookies is powdered sugar and refined sugar. Cookies should be cooked using refined sugar. This type of sugar will produce porous cake small and delicate.

2.2.5 Egg

Function of egg are establishing the structure and robustness of cookies, giving a sense of savory, giving aroma, softness and can also function as a natural emulsifier. Too many eggs will make the cake becomes brittle. The eggs used are fresh eggs (pH 7 to 7.5), not in cold conditions, is not damaged or broken before use. Egg whipped first before use (Faridah, 2008, p,48). Egg yolks bind the dough and add flavor, as well as maintaining the cake remains crisp after baking. While the egg white tends to make the cake becomes drier and has a texture like cake.

2.2.6 Milk Powder

Cookies are usual cooked with full cream milk powder and skim milk powder. The function of milk powder are adding nutrient value, adding aroma and flavor, helping establish the texture of cookies, and giving color to the cookies. According to Paran (2008, p,7), full cream milk powder and skim milk powder are differences and that lies in the comparison of the fat of protein contained in it:

- (a) Full cream milk powder has fat of protein is about 1,1% or contain 28 gr fat content and 25 gr protein in every 100 gr.
- (b) Skim milk powder as fat of protein 0,03% or contain 1 gr fat content and 33 protein in every 100 gr.

Milk powder suitable for making cookies is skim milk powder.

2.2.7 Baking Powder

Baking powder is a developer material (leavening agent), which consists of a mixture of sodium bicarbonate, sodium aluminum phosphate, and monocalcium phosphate. Baking powder is used to develop cake. According to Faridah (2008, p,53), baking powder has three types are fast acting, slow acting, and double acting.

1. Fast acting : react when shaking
2. Slow acting : react when roasting
3. Double acting : react when shaking and roasting

2.2.8 Aroma

According to Wibowo (2012), An extract from the aroma of foodstuffs such as vanilla, chocolate, mocha, orange, strawberry and others. Aroma used to augment or reinforce the aroma of the ingredients of cake, bread, cakes, puddings and drinks.

2.2.9 Salt

According to Lekker (2011), salt can evoke flavor or aroma, also plays an important role in causing the color of the crust. The amount of salt added depends on several factors, especially the type of flour used. Flour with lower protein content will require more salt because salt will strengthen the protein.

2.3 Products of Cookies

Cookies are from word koekie that means small cakes. According to BSN (1992), cookies are one of types biscuit that is made from soft dough, high fat, relatively crisp when broken and densely textured sectional cuts. Cookies can be classified based techniques formation (make-up) used (Hamidah, 1996, p,94). The classification of cookies (cookies) is comprised of:

1. Dropped cookies (formed using a spoon)

Dropped cookies made from dough or batter light and this dough is soft and malleable.

2. Molded cookies (rolled)

Types of cookies (cookies) are formed by using the mold but not in shape by hand and then cut with a knife. Therefore, the dough should be soft to make it easier rolled on the table and then cut into pieces.

Cookies have quality requirement that based on Standar Nasional Indonesia (SNI 01-2973-1992)

Test Criteria	Classification
Calory (calory/100 g)	≤ 400
Water (%)	≥ 5
Protein (%)	≤ 9
Fat (%)	≤ 9.5
Carbohydrate (%)	≤ 70
Ash (%)	≥ 1.5

Table 2.3.1. Quality Requirement of Cookies

Source: BSN (1992)

2.4 Technique for Making Breadfruit Cookies

According to Smith (1972), process for making cookies divided to be three phases, there are mixing process, molding process, and baking process.

1. Mixing Process

Mixing process is all of material mix to be one and form the dough. The dough made for to form the framework of cookies. During the absorption of water by mixing wheat protein to form gluten which will form the structure of the cookies until dough forms a homogeneous (Pertiwi, 2006).

There are 2 ways of mixing creaming fat and sugar are mixed together and then put the flour, and the all-in method is to mix all the ingredients together until homogeneous (Turisyawati, 2011).

2. Molding Process

According to Smith (1972) molding meant to get cookies with same form and to increase the attractiveness. Molding did by hand and then cut with a knife. Therefore, it put on brass and give the distance to avoid each other so that cookies are not sticky. Brass used is short brass (high is maximum 3 cm) because high brass wil absorb more heat.

3. Baking Process

Baking process is the most important factor in making cookies. Factor of baking can influence the quality of cookies. Generally, temperature for cookies is about 130⁰-200⁰C (Widowati, 2003). The oven should not be too hot when the material is inserted because the outside will precocious. It can inhibit the development and cookies surface becomes cracked. According to Ekky (2013), shows the baking temperature of 110⁰C with a time of 30 minutes is the best treatment in the making of breadfruit cookies. According to Rosi (2010), raw materials used in the making of cookies may affect the final quality cookies, besides the baking factors can also affect the quality of the resulting cookies.