

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Ingredient Review

##### 2.1.1 Modified Cassava Flour

Modified Cassava Flour is a flour made from cassava through fermentation where microbial BAL (*Lactic Acid Bacteria*) dominates during the fermentation process (Kartikasari et al., 2016). Mocaf has a natural white color and new properties that can be used as a substitute for many types of flour. Historically, Mocaf was first created as a substitute for wheat flour (Frediansyah et al., 2012).



**Figure 2.1** Modified Cassava Flour

Unlike tuber-based foods, Mocaf has been cited as a gluten-free staple food alternative (Risti, 2013). With its relatively high content in fiber compared to wheat flour, mocaf is able to serve as a functional food ingredient, especially for patients suffering from certain diseases, such as autistic and celiac type of individuals who do not have gluten tolerance. Mocaf is required as a functional food for certain groups who desire to maintain their health by replacing wheat flour with mocaf (Supadmi, Murdiati, & Rahayu, 2016).

### 2.1.2 Chicken Feet Flour

As a food ingredient, chicken is versatile other than ducks and birds. It is also used as a food source of protein besides fish and beef. The most popular parts of chicken meat are the breasts and thighs, while those that are less popular are the legs or known as chicken feet. Nutrient can be found by turning chicken feet into a flour. On the protein content of chicken feet flour, it has been found that the protein content of it was very high at 49.36% (Rasbawati, Rauch 2019). Chicken feet contain a large amount of protein, with essential minerals and collagen being the main components of protein. With the content of 19.8 grams of protein in 100 grams of chicken feet, it shows that protein is a healthy nutrient that helps the growth and development of children.



**Figure 2.2** Chicken Feet Flour

Chicken feet are delicious and very rich with omega 3 and omega 6 content, 187 mg and 2,571 mg per 100 grams. Omega 3 and omega 6 is an unsaturated fatty acid which is very important for body health (Self Nutrition Data, 2014). Omega-3 is included in the group as an essential fatty acids due to the fact that they can't be produced by the body and can only obtained from food consumed daily. Fatty acid other essentials included in the "omega" group is omega-6 (Rashid, 2003). A past study explained that chicken feet can be used as a raw material for the production of new products especially in the food sector, and often uses chicken feet bone for food preservation (Yusran, 2019).

## **2.2 Product Review**

Crackers are a well known snack among the community of food lovers. They are usually made from wheat flour with its crispy texture, dry layer, and salty flavour. However, with the high manufacturing of wheat flour crackers, it made a high impact on the activity of the import of wheat flour. Aside from its high demand on wheat product, a person with gastrointestinal issues or a gluten related disorder can trigger an inflammatory reaction inside the body when they overconsumed too much gluten (Passali et al.,(2020),. Therefore, the manufacture of crackers can utilize many kinds of composite flour made from local food ingredients that is commonly found in indonesia with its high nutritional value.

In this case, modified cassava flour can be utilized to produce healthier options in everyday snacking options due to its better chemical properties than natural flour, with its soft texture, no cassava scent, white in color, contains fiber and high calcium and gluten free (Hadistio & Fitri, 2019).

With the additional ingredient of chicken feet flour, crackers have additional nutrients such collagen that can prevent osteoporosis and maintain a good skin elasticity. The collagen content in chicken feet is also equivalent in activity with ACE-inhibitor which is an anti hypertensive medicine. this can result in reduction of renin levels in a plasma. In result, it can surpress high blood pressure.

## **2.3 Process Review**

Drying method is a method of food preservation by evacuating water content from fruits, meats, grains, and herbs by circulating hot air through it, which prohibits the activity of food spoiling by microorganism. Water as the main component of food, is essential for the oxidation of fats and lipids and the growth of microorganisms in diets with a high water content and high water activity. The main purpose of drying method is to partially remove water from the food matrix in order to extend the shelf life and prevent food spoilage.

There are 2 sections of drying technologies, traditional and

unconventional. Traditional drying methods include solar drying, hot air drying, osmotic dehydration, heat pump assisted drying and spray drying. Many traditional drying techniques are cheaper to use. Nevertheless, the main drawbacks of traditional drying technology are long drying time, poor quality, and inefficient energy consumption.

As a result of many negative drawbacks, many unconventional drying techniques are considered today such as freeze-drying and atmospheric freeze-drying that have been investigated to meet the future's food and energy needs. In addition to improving drying effectiveness and reducing environmental impact, it also improves the quality of dried products. Other unconventional drying techniques such as electrohydrodynamics, pulsed electric fields, microwaves, radiofrequency, and ultrasound have attracted most attention among all drying techniques due to their high efficiency and short operating time.

Drying methods are generally considered to be a promising method for improving the storage stability of various processed foods. Aside from their advantages, drying methods have disadvantages such as changes to harder texture from product due to more time for drying, nutrient loss, and changes in the color of the final product due to redox reactions and browning reactions.