

CHAPTER II

LITERATURE REVIEW

2.1 Ingredient Review

2.1.1 *Moringa* Leaves

The leaves of the *Moringa* plant are full of nutrients such as protein, amino acids, carbohydrate, minerals, vitamins, and organic acids, also provide a variety of benefits, especially for children's nutritional health. Unfortunately, there is still little use of *Moringa* leaves as food ingredients that can be further processed into a variety of enticing, affordable food products. It is anticipated that culinary innovation will support children's nutritional sufficiency. A significant crop in Asia and Africa is *Moringa Oleifera* (MO), a plant from the *Moringaceae* family. Because its leaves, pods, and seeds contain a range of vital compounds, *Moringa* is a nutrient-dense plant. Because of its great nutritional value, *Moringa* is healthy and can treat nutritional deficiencies.

Moringa is therefore referred to as Mother's Best Friend and the Miracle Tree. All components of the *Moringa* plant, including the leaves, flowers, fruit, stems, roots, and seed, provide health advantages. However, the leaves have the highest antioxidant content compared to the fruits and flowers. Regarding Human Micronutrient and Macronutrient Needs, *Moringa* provides more nutrient per gram of plant material than any other plant species. *Moringa* leaves contain equivalent vitamin C in 7 oranges, equivalent to vitamin A in 4 carrots, equivalent with the calcium in 4 glasses of milk, the potassium is equivalent to that contained in 3 bananas, and the protein is equivalent to the protein in 2 yoghurts (Mahmood,2011; Fauziah, 2022).

Because they are so rich in antioxidants and others elements that people in underdeveloped nations sometimes lack, *Moringa* leaves are primarily used for both medical and dietary purposes. Credited to the large number of bioactive substances, including vitamins, phenolic acids, flavonoids, isothiocyanates, tannins, and saponins, which are abundant in various plant parts. The most extensively researched *Moringa* leaf extract has showed promise in treating a number of chronic diseases, including cancer, non-alcoholic steatohepatitis, hypercholesterolemia, high blood pressure, diabetes, insulin resistance, and general inflammation. *Moringa* is not only high in nutrients, but it also has functional capabilities, since this plant contains features and advantages for human health. This plant's nutritional value as well as its many active compounds can be used to benefit both living creatures and the environment. Many areas of the leaves of the *Moringa* plant contain the plant's active ingredients. *Moringa* leaves are regarded as being relatively safe, efficient, affordable, and accessible.



Figure 2. 1 *Moringa* Tree

2.1.2 Chicken Thigh

All across the world, the public love chicken products and fresh chicken meat. Chicken is unique compared with other meat commodities as lean growth is typically prioritized with less emphasis placed on meat quality and sensory attributes (Dransfield and Sosnicky 1999; Dahrer, 2018). This occurrence can be explained by the absence of cultural or religious restrictions on this meat, as well as the perception of it as a nutritious diet with low fat content and higher levels of beneficial unsaturated fatty acids than other varieties of meat (Barroeta, 2007; Gordana, 2018). More crucially, despite having variable production costs, high-quality poultry products can be found for reasonable charger. When considering the total consumption of all meat varieties, poultry meat consumption ranks among the highest in every nation in the world (Valceschini, 2006; Hamza, 2022).

Poultry meat is considered one of the most desirable meats all over the world (Kamboh and Zhu, 2013; Rekha. 2020) as it is rich in proteins, amino acids, carbohydrates, polyunsaturated fatty acids (PUFA), minerals and is low in fat. According to USDA (U.S Department of Agriculture), chicken thigh is a tender and flavorful protein source, it is true that chicken thigh has contain more fat and the nine essential amino acids that our bodies cannot produce on their own are all present in chicken, making it a complete protein. When compared to red meat, chicken contains more calcium, magnesium, phosphorus, and sodium. Additionally, all chicken pieces, especially the thighs, contain tryptophan, and amino acid that increases serotonin. However, it was reported

that chicken thigh had a range of both oxidative and glycolytic muscle fibers (Horak *et al.*, 1989; Bohrer, 2018). Color, lipid content, and moisture retention are just a few of the quality-affecting aspects that could be impacted by the variation in chicken breast and thigh muscle fiber type, however, would only be visible in the chicken thigh.

2.2 Product Review

2.2.1 Chicken Nugget

Chicken nuggets are a type of battered meat product made from chicken meat that has additional ingredients added to it to make it more filling and therefore less expensive. To preserve quality, nuggets are created from seasoned beef or meat that has been coated in a mixture, partially cooked in oil, and then briefly frozen. Several studies, this product is convenient to eat because it is offered in a partially pre-cooked and contains valuable nutrients like other meat products, other factors due to shape and the crispy layer on the nugget. However, these products are considered a source of saturated fat and cholesterol, and a poor source of dietary fiber, which make these products a risk factor or coronary heart disease (CHD), obesity, diabetes (Stender *et al.*, 2007; Ayman, 2020), and cardiovascular diseases (Lairon *et al.*, 2005; Dewi, 2021). The major composition of nugget is chicken meat, protein from vegetarian source, gum and a fair amount of chicken skin (Marikkar *et al.*, 2011; Ital, 2020).

Nuggets are restructured meat product with batter and coater to retain the quality (Lukman *et al.*, 2009; Ital, 2020). Restructured meat is one of the meat processing technologies which utilize the relatively small size and irregular shape of meat to be processed into a wholesomeness meat product

which could add of those small meat pieces (Evaruarini and Purnamo, 2011; Sharima, 2018). Grumbles (2008; Sharima, 2018) reported that chicken nugget was the only nugget accepted worldwide that has reached high level of popularity compared to other meat. In fact, until now, the most common nuggets that can be found and available in the market is chicken nugget.

2.3 Process Review

2.3.1 Steaming

Steaming is a cooking method that requires moist heat and a cooking process that places the food above the boiling water, not inside, to produce steam that cooks the food with a moist hot air. Steaming takes a few minutes longer than average blanching time, which typically maintain more nutritional value than water blanching. Several studies suggested steaming as the most efficient process to retain health-promoting compounds in cruciferous vegetables when compared to for example, blanching, boiling, or microwaving (Soares *et al.*, 2017; Tomas, 2018). However, (Xiao, 2018) mentions that steam blanching effectively prevents the enzymatic browning reactions in vegetables. Fresh and blanched with steam compared to dried *Moringa* leaves, are a better source of dietary antioxidants. Steam blanching significantly reduced the crude protein and crude fiber contents but significantly increased the fat and carbohydrates content.