

CHAPTER II

LITERATURE REVIEW

2.1 Ingredient Review

The main ingredients that will be used to make snacks are carrots and oats. The use of this ingredient is because the fiber content contained in each main ingredient is quite high. Current technological developments have resulted in many innovations in food products that use oats. Some of the innovations that have been produced include food bars, cakes, brownies, muffins and fast food (Utami, 2020).

Snacks that use carrots and oats are a good choice to satisfy snack cravings while maintaining health. This combination offers the perfect balance of taste and nutrition. First of all, carrots provide natural moisture and a refreshing light sweetness, while oats add a crunchy texture and are rich in fiber. Thus, snacks made from carrots and oats are not only delicious but also support a healthy and active lifestyle.

Oats are a well-known food ingredient in the type of grain (*avena sativa*) originating from European countries (Ramzan, 2020). Oats are excellent fiber, namely beta glucan, and rich in vitamins, minerals and antioxidants. Whole grains are a unique dietary source and group of antioxidants that have been validated to protect against heart disease (Bjarnadottir, 2015).

Many methods have been developed to help reduce blood pressure, such as giving carrot juice which contains anti-hypertension drugs. The highest mineral content of carrots is potassium at 320 mg 100 grams which functions to maintain water balance in the body and helps lower blood pressure. Potassium is a strong diuretic, so it helps lower blood pressure (Kusuma, 2012).

2.1.1 Carrot

Carrots (*Daucus carota*) are a horticultural root crop eaten throughout the world and have been popular since ancient times; it originates from southwest Asia in the region of Afghanistan (Koley, 2014).

Carrot plants are annual plants in the form of grass. The leaves are pinnate inward. The flowers are compound flowers like umbrellas, white and yellow the center is dark brown. (Handz, 2015).

According to Widiyanti, Carrot tubers are recommended to be consumed in the daily diet to meet the body's essential vitamin and mineral needs. Apart from being rich in beta carotene, carrots also contain high and complete nutrients which can prevent free radicals from becoming cancer. The high percentage of carrots eaten, and the benefits of large carrots are not offset by optimal utilization efforts.

Some people process carrots by simply mixing them into their daily food, even though with the compounds they contain, processing techniques can be used to turn carrots into various products that can be consumed at any time (Nurtaati, 2016).



Figure 2.1 Carrot

Fresh carrots have a high-water content, causing processed products from carrots to also have a high water content, so to make this snack we use low protein wheat flour. Low protein wheat flour has low water absorption properties which will produce a less elastic dough resulting in a dense texture because the snack has a crispy texture. Carrots have several health benefits, one of which is:

1. Eye Health

This is perhaps the most widely known nutritional benefit of carrots, but it should not be overlooked. This orange vegetable gets its colour in part from beta-carotene, which belongs to the carotenoid family of antioxidants. Beta-carotene has been shown to help prevent age-related eye diseases, such as macular degeneration.

2. Immunity

Beta-carotene also helps produce vitamin A in the body, which is important for improving the body's defence system, especially during cold and flu season. Vitamin A helps our bodies respond to invaders and regenerate new cells to stay strong.

3. Skin Health

Whether you're looking for a fresh glow or want abrasions to heal as quickly as possible, carrots can help. The aforementioned carotenoids—retinol, biotin, and lycopene—are skin protectors and they're all hidden in carrots, so keep munching for healthier, softer skin.

4. Inflammation

Nutrients like vitamin A and beta-carotene help fight inflammation, along with Fiber and an antioxidant called luteolin, also found in carrots. Fiber helps prevent chronic disease, keeps you regular and improves your gut health.

5. Brain Health

Luteolin offers another amazing health benefit-maintaining brain health. Carrots not only help improve memory but may also help prevent cognitive decline. Apart from improving eye, brain and skin health, carrots may be a new source of youth.

2.1.2 Oat

Oats are a well-known food ingredient in the type of grain (*Avena Sativa*) originating from European countries (Ramzan, 2020). Oats are excellent fiber, namely beta glucan, and rich in vitamins, minerals and antioxidants. Whole grains are a unique dietary source and group of antioxidants that have been validated to protect against heart disease (Bjarnadottir, 2015).



Figure 2.2 Oat

Research published in the International Journal of Molecular Medicine (2018) Beta-glucan content is believed to have many benefits. Many studies have shown that beta-glucans can help with weight loss. Beta-glucan fiber absorbs water and increases the viscosity (or thickness) of digested food, thereby increasing the volume of food in the intestine. This slows digestion and the speed of nutrient absorption, leading to increased feelings of fullness.

Oats contain many antioxidants, such as avenanthramide, selenium, phenol, Vitamin A, Vitamin C, Vitamin E. It can protect the body in the sense of maintaining ideal body weight. The content in oats is believed to be the main ingredient in snacks for people suffering from diabetes mellitus.

Oats have been known for a long time as a food that has positive benefits, especially as a food high in fiber and controlling cholesterol levels (Widodo, 2014). Oats are often used as an additional ingredient in other products with specific purposes such as enhancing taste, improving texture, providing mouthfeel, and reducing cooking loss by absorbing water content.

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2.2 Product review

Snacks made from carrots and oats are an appetizing and healthy choice. This combination produces a snack that combines the natural sweet taste of carrots with the savoury and crunchy texture of oats. Snacks that use carrots and oats are a smart choice to satisfy snack cravings while maintaining health. This combination offers the perfect balance of taste and nutrition.

Crispy carrot snacks are a popular and healthy snack. Made from dried carrots to produce a crunchy texture, the crunchiness can fill the stomach. Dry products are said to have an acceptable level of crispness if the water content is less than 5%, where in this condition the material can still be broken, which means the product still has good crispness (Muchtart, 2017).

This research aims to produce whole grain crunchy carrot, which combine the nutritional benefits of whole grains and carrots. The study details the production process and sensory evaluation, finding that these snacks can be a nutritious, high-fiber snack option that aligns with consumer demand for healthier snacks. Hamaker, B.R., Suslow, T.V., and Cantwell, M.I. (1998).

2.3 Process review

The drying process, which is a heat and mass transfer event that involves the transport of water in the product from the inside of the product to the surface and evaporates from the surface, is a process commonly used in the food and industrial sectors. By drying, the shelf life of the product is extended, the mass and volume

of the product is reduced, so that transportation and storage of the product becomes easier, more efficient and economical (Khan, I, 2022).

The heating process aims to strengthen the taste and eliminate rancid odors and the last is drying to reduce the water content so that the shelf life is longer (Decker, 2014).

Drying using an oven has the advantage that the heating temperature in the oven is more thorough and the resulting temperature cycle is more perfect so that it can optimize the drying process. The drying method using an oven is a good way to determine the phytochemical content of simplicia, apart from being able to be completed in a short time, the temperature used can also be monitored. The temperature used to dry simplicia materials using an oven is between 30 °C to 90 °C with an optimum temperature of 60 °C (Supriningrum, Fatimah and Wahyuni, 2018).

Oven drying is one of the drying methods that is widely used today with the aim of analysing the content of organic simplicia. Apart from not requiring a lot of special equipment, this method is also faster than drying in direct sunlight (Arifiyana and Dipahayu, 2018).

Drying in direct sunlight is the most economical and simple drying method, but it has the disadvantage that it can cause leaves to lose colour, taste and content when exposed to direct ultraviolet light due to the difficulty of regulating the temperature when exposed to sunlight.