

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Ingredient Review

##### 2.1.1 Beetroot

Red beet (*Beta vulgaris*) or beet root is a vegetable from coastal Europe, classified as a flowering plant from the Chenopodiaceae family which has been widely cultivated in Indonesia because the dark red plant that bulges at the root has economic value and good benefits for consumption (Bastanta et al., 2016). Beetroot can be consumed raw or processed into drink such as juice (Purba et al., 2021).



**Figure 2.1** Beetroot

Some of the benefits of beetroot juice are lowering blood pressure, increasing the amount of oxygen, improving stamina, preventing congenital disabilities, and overcoming menstrual problems (Purba et al., 2021). Beetroot have long been known as super food because they have many health-beneficial ingredients such as carotenoids, nitrates, flavonoids, vitamins, minerals such as potassium / sodium, phosphorus, calcium, magnesium, copper, iron, zinc, manganese, sodium, and betalain (Arma et al., 2020). Beetroot has several good ingredients for the body such as 34% folic acid which functions to grow and replace damaged cells, potassium 14.8% which

functions to facilitate fluid balance in the body, fiber 13.6% which functions to help overcome cholesterol disorders, vitamin C 10.2% which functions to grow tissues and normalize blood vessels, magnesium 9.8% which functions to maintain muscle and nerve function, tryptophan 1.4%, Iron 7.4% which functions energy metabolism and immune system, copper 6.5% which functions to form red blood cells, phosphorus 6.5% which functions to strengthen bones, caumarin, betacyanin (Rohanah et al., 2023).

### **2.1.2 Pumpkin**



**Figure 2.2** Pumpkin

Pumpkin is a food ingredient rich in vitamin A which is an antioxidant that is beneficial for body health, among others, for anti-aging and preventing degenerative diseases. In addition, yellow pumpkin is one of the foods that contain high fiber with a content of 2.4 grams per 100 g. Food fiber is divided into 2 types, namely water-soluble dietary fiber and water-insoluble dietary fiber The main function of insoluble dietary fiber is to prevent various diseases (Suryani et al., 2014). Yellow pumpkin has very complete nutrition among them are Carbohydrates (6.6g), Protein (1.1g), Fat (0.3g), Calcium (45mg), Phosphorus (64mg), Iron (1.4mg), Vitamin A (180sl),

vitamins B (0.08mg), water (9.1g), vitamin C (5.2mg) (Wandira et al., 2022).

### 2.1.3 Arrowroot Starch



**Figure 2.3** Arrowroot Starch

Arrowroot tubers (*Marantha arundinaceae*) are local root plants that are found in many parts of Indonesia. This plant is easy to grow in an environment with minimal sunlight. Care on this plant is also not difficult. Pests and diseases that attack this plant are also small. This plant is able to grow on soils with low fertility levels, although the best results should be fertilized. So it can be easily cultivated (Caesarina et al., 2016). Analysis of the nutritional composition of arrowroot flour shows that in 100 grams of arrowroot flour contains calories of 355 calories, carbohydrates 85.2 grams, fat 0.2 grams, and protein 0.7 grams (Tamrin et al., 2016). Arrowroot or can be called *Maranta arundinacea*, in addition to having a good distinctive taste, arrowroot is also high in fiber and rich in nutrients, so there is no doubt about its ability to meet nutritional and health needs (Firdaus et al., 2021).

## 2.1.4 Fiber Cream



**Figure 2.4** Fiber Creme

Fiber cream is a creamer derived from vegetable fat. Thus, it is lactose-free, gluten-free, and low in sugar. The total fat contained in 100 g is 1 gram with 1 gram of dietary fiber and 0 grams of sugar content. FiberCreme is one example of a non-dairy creamer product circulating in Indonesia. FiberCreme is a multifunctional and high-fiber non-dairy creamer that can be used as a substitute for milk or coconut milk (Wardani et al., 2020). FiberCreme has a taste that is almost similar to coconut milk (Martadjaja, 2022).

## 2.2 Product Review

Indonesian people have a high level of consumption of snacks. Dodol is classified as semi-wet food (Intermediate moisture food) which has a chewy texture, has a sweet taste so that it can be eaten immediately. The desired functional characteristics of dodol are related to the structural properties of processed food products, namely texture (Lukito et al., 2017).). Dodol is a high-sugar food. The sugar content in dodol which is sucrose is at least 45% (Setiavani et al., 2018). In this dodol beetroot pumpkin study used 16% brown sugar.

Various studies on modifying the dodol processing process to improve the efficiency of the process and the nutritional value of dodol

have been widely carried out (Setiavani et al., 2018). The nitrate content contained in beets has a blood pressure-lowering effect, will be reduced to nitrite by normal flora found in the oral cavity (Alizar, 2020). Interests on pumpkin are increasing due to its low in energy compared with other vegetables, and high amounts of carotenoids poliphenols, flavonoids, pigments that are gaining importance due to their antioxidant activity, polysaccharides, pectin, and dietary fiber, minerals (potassium, calcium, magnesium, sodium, iron, iodine, zinc), vitamins (A, C, B1, B2, B9, PP), and other substances beneficial to health. They provide ranges of sweetness, texture, color, and low calorie bulk as fresh alternatives to the proliferating array of readily available, carbohydrate rich, processed foods (Celcu et al., 2020). Arrowroot starch can increase stomach PH levels. In addition, this starch can also reduce the number and injury to the stomach, if regularly consume arrowroot root flour can reduce stomach ulcers and stomach acid (Firdaus et al., 2021). Fibercrème is a vegetable creamer that uses oligosaccharides as a source of fiber and combined with vegetable oils. With a high content of dietary fiber, the addition of fibercrème to a food product, is known to increase its nutritional effect (Chintyadewi et al., 2021).

## **2.3 Process Review**

### **2.3.1 Boiling**

Boiling is the process of transferring a medium from a liquid to a vapour state by applying heat. When a liquid medium is applied to heat, then the medium will start to boil at a certain temperature (boiling point temperature). At this particular temperature, the liquid phase changes to the vapour state, known as the boiling phenomenon. Boiling phenomenon is generally observed in unit operations such as evaporation, distillation and steam generation and is the opposite of the condensation phenomenon (Purohit et al., 2023). Boiling is a technique of

cooking food ingredients in liquids up to a boiling point of 100°C. The liquid used can be in the form of water, broth, coconut milk or milk (Kurniadi, 2017).

### **2.3.2 Steaming**

Steaming is a technique of steaming food ingredients with boiling water vapor (Kurniadi, 2017). Unlike boiling, where food is submerged in water, steaming keeps the food separate from the boiling water but allows it to come into direct contact with the hot steam.