

CHAPTER II

Ingredients and Utensils Overview

2.1 Description of The Material to be Used

In order to create the product, there are several materials that will be used along the process, the key materials are:

1. Dragon fruit skin



Figure 1. Red dragon fruit skin

Source: pixels.com by Phachesnie Studio, accessed on May 11th, 2020

The main ingredient in manufacturing process of this product is the Red Dragon fruit skin because the author has a lot of dragon fruit trees growing in her house. Therefore, the writer has an idea of how to use dragon fruit skin to be something useful and nutritional and safe to consumes for human.

Besides that, the writer also found out that there is a lot of information on the skin of the dragon fruit that turns out into a waste because people do not know how to process the skin of the dragon fruit. And people do not know that the dragon fruit skin is very nutritious and has many benefits.

Dragon fruit is considered as one of the most important and widely planted fruit in Indonesia, especially for the red-flesh color. In Yogyakarta, the flowering season and

dragon fruit production only occurred in October-May (Palupi and Farida, 2014). Facts in the field are seen that in some locations dragon fruit plantations are located close to the equator line such as Riau, Riau Islands and West Sumatra flowering and dragon fruit production occur throughout the year (Jumjunidang, 2015). The plant genus *Hylocereus* begins to produce production 2-3 years after being on planting and achieving full production after 5 years (Jacobs, 1999).

In Indonesia the largest dragon fruit crop is found on the island of Java (Jaya, 2009). Besides on the island of Java dragon fruit cultivation is also developed on the island of Sumatra such as North Sumatra, West Sumatra, Riau, Riau Islands, Lampung and Kalimantan Island like East Kalimantan. In Kutai Kartanegara, East Kalimantan dragon fruit can grow and producing which is generally the planting of dragon fruit is planted on marginal land which has low soil fertility (Muas and Jumjunidang, 2015). However, until now there has been no official data on how extensive the dragon fruit plantations are.

Based on the results of a 2012 survey of several dragon fruit plantation locations in West Sumatra (Padang Pariaman and Kabupaten Solok) obtained information that Dragon fruit cultivation has been carried out intensively (Jumjunidang, 2012) with the productivity of dragon fruit in Indonesia is around 24-30 tons/ha/year (Muas and Jumjunidang, 2015).

Table 1. nutritional values of red dragon fruit and red dragon fruit skin.

Komponen	Kadar Buah Naga	Kadar Kulit Buah Naga
Protein (g)	0,16 - 0,23	0,53
Lemak (g)	0,21 - 0,61	2,00
Serat (g)	0,7 - 0,9	0,71
Vitamin C (mg)	8,0 - 9,0	9,40
Karbohidrat (g)	11,5	11,5
Fosfor (mg)	30,2-36,1	8,70

2. Distilled Water



Figure 2. Distilled Water

Source: Amidewater.com, accessed on May 11th, 2020

In the process of making popping boba, distilled water a must and one of the most important ingredients. It cannot substitute distilled water by using any kind of minerals water or even tap water. If it is hard to find distilled water brand selling in your country, it is probably easier by making them at home.

To make distilled water, water is heated to the boiling point. This will create vapor (or steam), return the liquid state, the contaminants in removed during the Is distilled water water? Well it is distilled water is is free from bacteria. However, the also removes minerals for our body. that drinking distilled body, but not than most other types of drinking water.

Nutrition Facts	
Purified Water	
Serving Size: <input type="text" value="1"/> serving 8 fl oz (237g)	
Amount Per Serving	
Calories 0	Calories from Fat 0
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Polyunsaturated Fat 0g	
Monounsaturated Fat 0g	
Cholesterol 0mg	0%
Sodium 9.5mg	0%
Potassium 0mg	0%
Total Carbohydrates 0g	0%
Dietary Fiber 0g	0%
Sugars 0g	
Protein 0g	
Vitamin A	0%
Vitamin C	0%
Calcium	0.6%
Iron	0%
* Percent Daily Values are based on a 2000 calorie diet.	

which is captured to and bottled. Most of the water are distillation process. healthier than tap debatable. Since generally water that contaminants and distillation process that can be healthful Evidence suggests water is fine for your necessarily healthier

But in Indonesia itself, it is not safe to consume tap water in any different region. Since the water is not drinkable like in others country that claim and provided drinking tap water. Even though in some other country are allowed and able to drink tap water, some people tend to hate to drink them. There are some factors, why people dislike or hate drinking tap water it is because of the after taste and not used to.

Figure 3. Nutrition Fact of Distilled/Purified Water

Source: nutritionix.com, accessed on May 11th, 2020

As it shown from the nutrition facts table, like most forms of drinking water distilled water has no calories, there are also no carbohydrate, no fat and no protein. For vitamin itself Distilled water differs from traditional tap water in that the minerals have been removed through the distillation process. Therefore, distilled water provides no vitamins or minerals.

According to the Centers for Disease Control and Prevention (CDC), the distillation process is very effective at removing protozoa (such as cryptosporidium or giardia), bacteria (such as campylobacter, salmonella, shigella, E. coli), and viruses (including enteric, hepatitis A, norovirus, and rotavirus).

Distillation also removes chemical contaminants, including arsenic, barium, cadmium, chromium, lead, nitrate, sodium, sulfate, and many organic chemicals, according to the CDC. However, all community water systems must meet the standards of the Safe Drinking Water Act, which sets safe levels for these contaminants.

If your immune system is compromised or suppressed, doctor may recommend drinking distilled water since it is free from harmful organisms. “Cryptosporidium” (also known as "crypto"), for example, can cause or exacerbate illness. While other methods do not eliminate crypto from the water supply, distillation kills it. Reverse osmosis also kills the virus.

Some people on low-sodium diets prefer distilled water because the sodium in it has been removed. While most tap water does contain sodium, levels are still quite low, so distilled water may not be necessary. Drinking enough water is critical for health and wellness. If you are getting minerals through food sources).



water may not be enough water is and wellness. If water is distilled drink more, it may you (but make sure minerals through

While there is no reported case of allergy attributed to distilled water, there are rare cases of an allergy to water. This is called “aquagenic urticarial” and according to the National Institutes of Health, it is a rare condition in which hives or itching develops after the skin meets water. Since it is so rare, there is limited information about effective treatments. Drinking or washing with distilled water does not help alleviate or prevent this condition

Many essential minerals naturally present in water are eliminated in the distillation process. These may include calcium, magnesium, iodine, fluorine, and lithium, although in trace amounts. If consuming water for the purpose of gaining these minerals, you will not get them from distilled water. Cooking with distilled water can also cause significant loss of the vitamins and minerals in food. Most health experts advise that we get our vitamins and minerals from food, and this is even more important if you do not get any minerals from water.

3. Red Dragon fruit

Figure 4. Red Dragon Fruit

Source: Alodokter.com, accessed on May 12th, 2020

Another component that we will use for this product is Red dragon fruit or Pitaya. Even though in this product is focusing on using some “waste” from Red dragon fruit itself we still need a flavor of the dragon fruit too. Since the skin of dragon fruit, did not have any taste, we still need to use some of dragon fruit juice to gives a more flavor and dominant or vibrant color.

	Amt.per Serving	% Daily Value*
Calories	60	
Calories from Fat	0	
Total Fat	1.5 g	
Saturated Fat		
Trans Fat		
Cholesterol	0 mg	0%
Sodium		
Total Carbohydrates	9 g	
Dietary Fiber	1 g	
Sugar	9 g	
Protein	2 g	

Figure 5.
Red
Source:

Nutrition of
Dragon Fruit

*Percent daily value are based on a 2,000 calorie diet.

Sehatalamiah.com, accessed on May 12th, 2020

Table 2. Nutritional values of red dragon fruit

<u>Komponen</u>	<u>Kadar</u>
<u>Nutrisi Daging Buah</u>	
<u>Karbohidrat</u>	11,5 g
<u>Serat</u>	0,71 g
<u>Kalsium</u>	8,6 mg
<u>Fosfor</u>	9,4 mg
Magnesium	60,4 mg
<u>Betakaroten</u>	0,005 mg
Vitamin B1	0,28 mg
Vitamin B2	0,043 mg
Vitamin C	9,4 mg
<u>Niasin</u>	1,297 – 1,300
<u>Fenol</u>	561,76 mg/100 g
<u>Nutrisi Kulit Buah Naga</u>	
<u>Fenol</u>	1049,18 mg/100g
Flavonoid	1.310,10 mg/100g
<u>Antosianin</u>	186,90 mg/100g

Table 3. Nutritional values of red dragon fruit (2)

Zat	Kandungan Gizi
Kadar air (%)	96
Protein (g)	0,159-0,229
Lemak (g)	0,21-0,61
Serat kasar (g)	0,7-0,9
Karoten (mg)	0,005-0,012
Kalsium (mg)	6,3-8,8
Fosfor (mg)	30,2-36,1
Iron (mg)	0,55-0,65
Vitamin B1 (mg)	0,28-0,043
Vitamin B2 (mg)	0,043-0,045
Vitamin B3 (mg)	0,297-0,43
Vitamin C (mg)	8-9
Thiamine (mg)	0,28-0,30
Roboflavin (mg)	0,043-0,044
Niacin (mg)	1,297-1,300
Abu (g)	0,28
Lain-lain (g)	0,54-0,68

Dragon fruit is a type of fruit that is low in calories. In a portion of dragon fruit (about 100 grams) there are only about 60 calories. This fruit also does contain fat, but it's a polyunsaturated fatty acid (good fatty acids). However, the nutritional content of dragon fruit is quite high.

Here are some of the ingredients in dragon fruit and their health benefits for your body:

- a. **Vitamin C:** The content of vitamin C in dragon fruit (equivalent to 10 percent of the value of daily human needs) and functions as a good antioxidant to protect the body from exposure to free radicals. The content of vitamin C in dragon fruit is also good for stimulating the formation of collagen, maintaining endurance, and helping the absorption of iron so that the body does not lack blood.
- b. **Vitamin B2 and B3;** In addition to vitamin C, dragon fruit also contains vitamin B2 and vitamin B3. Both vitamins play an important role in maintaining the smooth metabolism of the body and maintaining healthy tissue. Sufficient vitamin B intake is also believed to reduce the risk of several diseases, such as migraines, cataracts, preeclampsia, and heart disease. Vitamin B is also said to play an important role in maintaining the health of the body's nerves.
- c. **Magnesium:** Dragon fruit is one type of fruit that contains magnesium. Thanks to its ingredients, this fruit can prevent and relieve muscle cramps, increase stamina and performance when exercising, maintain health and heart function, and lower blood pressure. Magnesium can also reduce the risk of depression, type 2 diabetes, and hypertension, and relieve migraine symptoms and premenstrual syndrome.
- d. **Iron:** Iron is a type of mineral that is very important for the human body because it acts as a raw material for making red blood cells. If the body lacks iron, the production of red blood cells in the body will decrease. As a result, you are at risk of developing anemia or lack of blood.

Dragon fruit has a high iron content, so that it can meet the intake of iron needed by the body and prevent you from various health problems caused by iron deficiency.

- e. Calcium: Calcium is needed by the body to maintain bone strength. In addition, the heart, muscles, and nerves also need calcium in order to function properly. Lack of calcium in the body can increase the risk of osteoporosis. However, you don't need to worry, because dragon fruit also has calcium in it. In addition to consuming milk, you can consume dragon fruit to meet your daily calcium needs
- f. Antioxidants: Dragon fruit is a type of fruit that is rich in antioxidants and natural coloring agents called anthocyanin's. This substance gives the dragon a bright red color. The content of the dragon fruit is known to protect cells and body tissues from damage caused by free radicals and even reduce the risk of cancer. After consuming the red dragon fruit, the color of your urine and feces may become reddish. However, you do not need to worry because it is natural to happen and is not dangerous. Reddish urine and feces are caused by anthocyanin substances contained in red dragon fruit. In addition to the above content, dragon fruit also contains lots of fiber so that it can prolong digestion. By regularly consuming high-fiber vegetables and fruits, including dragon fruit, you can be prevented from constipation.

4. Stevia Sugar



Figure 6. Stevia Sugar
 Source: Tropicanaslim.com, accessed on May 12th, 2020

In the process of making popping boba you need some sugar to make increase the flavor of sweetness. But we need something sweet but it's good for your health and do not have any bad impact to our body. So for sugar it's better to substitute to a plant base leaf's that still gives you a sweet taste but does not bad to consume, which is stevia.


Stevia (Stevia a member of the subgroup of the Asteraceae with unusually sweet names such as sweet leaf or people around the world years as a sugar substitute. sweetness while low heat. sweetness of sugar, while sugar. As a new sweetener, used in various types of pharmaceutical, and

INFORMASI NILAI GIZI (NUTRITION FACTS)		
Takaran Saji (Serving Size)	2.6 g	
Jumlah Sajian per Kemasan (Serving Size per Container)	50	
JUMLAH PER SAJIAN (AMOUNT PER SERVING)		
Energi Total (Total Calories)	0 kkal	
	%AKG*	
Lemak Total (Total Fat)	0 g	0 %
Lemak Jenuh (Saturated Fat)	0 g	0 %
Protein (Protein)	0 g	0 %
Karbohidrat Total (Total Carbohydrate)	3 g	1 %
Gula (Sugars)	0 g	
Natrium (Sodium)	0 mg	0 %
<p><small>*Persen AKG berdasarkan kebutuhan energi 2000 kkal. Kebutuhan energi Anda mungkin lebih tinggi atau lebih rendah. *Percent Daily Value are based on 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.</small></p>		

rebaudiana) is a plant that is chrysanthemum family, a family (ragweed family) leaves, hence its other sugar leaf. Millions of have been using it for many Stevia extract has high It is 200-300 times the heat is only 1/300 of stevia extract can be widely food, beverage, chemical industries.

Figure 7. Nutrition fact of Stevia Sugar
Source: Tropicanaslim.com, accessed on May 12th, 2020

Stevia sugar also linked to some health benefits, such as:

- a. Control blood sugar level, it is good for people who has a diabetes since it's a substitute sweetener of sugar and it's still give you a taste of sweetness.
- b. Stevia sweetener low heat.  extract is natural with high sweetness while
- c. Stevia insulin and significantly lowered glucose levels. It also left study participants satisfied and full after eating, despite the lower calorie intake.
- d. Stevia leaf powder manage cholesterol. The study found stevia lowered total cholesterol, LDL (“bad”) cholesterol, and triglycerides with no negative side effects. It also increased HDL (“good”) cholesterol.

5. Sodium Alginate

Figure 8. Sodium Alginate

Source: Kitchen-theory.com, accessed on May 12th, 2020

Sodium alginate (a food product derived from brown algae or seaweed) is a thickening and gelling agent that forms heat stable gels in the presence of calcium. This property allows cooks to make gelled spheres, in a technique known as spherification. Sodium alginate has been used in the food industry for many years to produce gel-like foods – for example, the pimento stuffing in prepared cocktail olives. It is composed of long strands made up of carbohydrate units – these long stands allow it to act as a very efficient thickening agent at low concentrations (e.g. 1%). Gels formed from alginates have the amazing ability of withstanding heating to temperatures as high as 150°C without melting, allowing them to be used in hot applications such as broths. When alginate is added to a liquid, it will act as a thickener. In the presence of calcium ions, a mixture containing alginate will form a gel. The calcium ions insert themselves between individual alginate strands and will allow them to interlock and form a gel.

6. Calcium Lactate



Figure 9. Calcium Lactate

Source: Tokopedia.com, accessed on May 14th, 2020

Calcium lactate gluconate is a white, odorless and taste neutral crystalline solid. Molecular formula: $C_9H_{16}CaO_{10}$ Calcium lactate gluconate contain 13% Calcium; its high solubility ranks it with a 400g/Liter second among Calcium salts. It is widely used in the treatment of osteoporosis and recent research claims a reduction of obesity by leveled administration of Calcium lactate gluconate. It also finds wide use in the fortified food industry.

It plays a major role in the molecular cuisine as auxiliaries to create spherifications of liquids. Sphere shaped objects from liquids with solid skin. Known in advanced cooking as: Spherification and reverse Spherification.

2.2 The Tools Used During the Processing

In order to create the product, there are several tools that will be used along the process, the key materials are:

1. Spoon



Figure 10. Spoon

Source: amazon.com, accessed on May 14th, 2020

In the process of making popping boba, we are using spoon to help separate the dragon fruit juice and the seed using a sieve to get the dragon fruit juice.

2. Cutting board



Figure 11. Cutting board

Source: Goodhousekeeping.com, accessed on May 14th, 2020

The function of using cutting board is to help the process preparing the dragon fruit.

3. Knives



Figure 12. Knives

Source: knivesandtools.com, accessed on May 14th, 2020

The knife will be used to cut the dragon fruit and to take the flesh skin of the dragon fruit.

4. Blender



Figure 13. Blender

Source: Philips.co.id, accessed on May 14th, 2020

The blender is used to blend the dragon fruit and obtain the juice, it is also used to blend distilled water with the Sodium alginate, and to mix the calcium lactate with the flavor juice.

5. Sieve



Figure 14. Sieve

Source: bmstores.co.uk, accessed on May 14th, 2020

The sieve is used to remove the dragon fruit seed with the juice and to remove any bubbles from the sodium alginate water mixture.

6. Bowl



Figure 15. Bowl

Source: amazon.co.uk, accessed on May 14th, 2020

The bowl is used to keep all the ingredients during the process of making the product.

7. Plastic wrap



Figure 16. Plastic Wrap

Source: shopee.co.id, accessed on May 14th, 2020

The plastic wrap is used to cover the bowl of the sodium alginate mixture to remove the bubbles.

8. Digital scale



Figure 17. Digital Scale

Source: leekes.co.uk, accessed on May 14th, 2020

The digital scale is used to weight all the ingredients.

9. Measuring glass



Figure 18. Measuring glass

Source: worldmarket.com, accessed on May 14th, 2020

The measuring glass is used to measure the amount of water or liquid.

10. Stove



Figure 19. Stove

Source: amazon.in, accessed on May 14th, 2020

The stove is used to provide heat for the process of simmering the water and dragon fruit skin into a syrup.

11. Saucepan



Figure 20. Saucepan

Source: amazon.in, accessed on May 14th, 2020

The saucepan is used to simmer the dragon fruit skin into syrup.

12. Silicone spatula



Figure 21. Silicone spatula

Source: amazon.com, accessed on May 14th, 2020

The silicone spatula is used to mix well, in the process of making product.

13. Funnel



Figure 22. Funnel

Source: amazon.com, accessed on May 14th, 2020

The funnel is used when fill the dragon fruit skin syrup, and popping boba into the bottles

14. Fridge



Figure 23. Fridge

Source: lg.com, accessed on May 14th, 2020

The fridge is used to cool down the liquid and remove bubbles from the sodium alginate mixture. And freeze the calcium lactate dragon fruit juice.

15. Ice cube tray



Figure 24. Ice cube tray

Source: shopee.com, accessed on May 14th, 2020

The ice cube tray is used to freeze the juice mixture and shape like a ball.

16. Stainless steel soup ladle with hole



Figure 25. Stainless steel soup ladle with hole

Source: pingganmangkuk.com, accessed on May 14th, 2020

The stainless-steel soup ladle with hole is used to pick up the popping boba easier.

