Dragon Fruit Jelly Drink (*Hylocereus polyrhizus*) Low Calories with Addition of Jamblang Leaves Extract (*Syzygium cumini*)

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Abstract. Dragon fruit and jamblang leaf extract was added into the formulation to reducing sugar intake and increasing antioxidant-rich food products. This paper is to study for a causal relationship between two factors that are intentionally generated to determine the effect of adding an element to jelly characteristics. In this study, the product was formulated by seeking the optimum combination of the ingredients: dragon fruit juice, jamblang leaf extract, carrageenan, and stevia. The stevia was selected as the sweetener for its low-calory property. The parameters observed were DPPH radical scavenging capacity, total flavonoids, sensory preference analysis, pH, syneresis level, and proximate analysis. The most critical parameter for determining the optimum formulation was panelist acceptance. Our data suggested that panelists mostly preferred jelly drinks with a ratio of dragon fruit juice to jamblang leaf extract of 80:20. The formulation exhibited 46.4% inhibition of DPPH (1,1-Diphenyl-2-Picrylhydrazyl) radicals and total flavonoids of 1.35 mg quercetin equivalent/g. The proximate analysis demonstrated that the formulation comprises 96% water, 1.1% lipid, 0% protein, 37.1% total sugars, and 0.18% ash. This finding should support this formulation's development into a functional food rich in antioxidants and offers less calory than its counterparts.

1 Introduction

Diabetes is often referred to as the silent killer because patients are often unaware of it until complications have developed. Data from the International Diabetes Federation (IDF)showed that diabetes prevalence continues to increase. The current number is 415 million people, and it is predicted to increase in 2040 by 55% to a total of 642 million. Indonesia, India, Brazil, Mexico, China, The United States, and Russia have the highest prevalence of diabetes (10 million people) in the world [1]. Data obtained from the research

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shows that the prevalence of people with diabetes in Indonesia has increased, from 6.2% in 2017 to 10.7% in 2020 [2]–[4].

One of the causes of diabetes is oxidative stress/damage to the pancreatic beta-cell tissue, and the formation of superoxide free radicals may lead to its complications. Diabetes risk factors can be inhibited by consuming functional foods that are rich in antioxidants. According to the American Nutritionists' Association, functional foods are a series of foods that include fresh whole foods or processed foods that are enriched or enhanced so that they have functions that can benefit the health of their consumers and reduce the risk of illness for their consumers [5], [6].

Dragon fruit was introduced in Indonesia in the 2000s, and since then, its cultivation has expanded, particularly in Sumatra, Java, Kalimantan, Sulawesi, and Bali. Total dragon fruit production in Java, the leading cultivation area, reached 24-30 tons in 2019 [7]. Dragon fruit contains fibers and antioxidants. This fruit may help prevent diabetes because it has various antioxidants, namely vitamin E, vitamin C, flavonoids, and beta-carotene, which inhibit reactive oxygen species (ROS) and reduce oxidative stress [8]. Another study stated that dragon fruit extract treatment effectively reduced aortic stiffness and controlled oxidative damage as measured by PWV in STZ-induced diabetes in mice [9]. Other evidence suggests that the effect of dragon fruit on prediabetes will help prevent diabetes. Although the effect on type 2 diabetes mellitus is not significant, it tends to decrease blood glucose greater with higher doses [10].

Considering the low diversification of dragon fruit products, this study investigates a food processing technology's suitability in generating a product that consumers can accept while delivering the fruits' bio functionality. The technology selected for this study is gelation, and the product is a jelly drink. This technology and product are chosen because Jelly drink is a gel (semi-solid) beverage product with the characteristics of a thick liquid consistent with high water content and is easy to suck (SNI-01-3552-1994). Consuming jelly drink can function as a delay appetite and can facilitate digestion because it contains high fiber. However, jelly drinks on the market generally use synthetic raw materials such as water mixtures, flavorings, and synthetic dyes to lower jelly drinks' health benefits [11]. One of the innovations made to improve jelly drink's functional value is to use natural ingredients as raw materials. The dragon fruit jelly drink is enriched with jamblang (*Syzygium cumini* L) leaf extract to enhance the dragon fruit jelly drink's functionality.

Jamblang (*Syzygium cumini* L) is an indigenous plant of Indonesia. Despite growing in many parts of the country, the plant parts are not mostly sold, particularly in modern produce markets. Therefore, the plant parts are not widespread and are widely consumed. It is an unfortunate trend, considering it is rich in alkaloids, flavonoids, resins, tannins, and essential oils. Jamblang leaf can be used to reduce blood sugar levels. Besides, jamblang leaf extract demonstrated high antioxidant activity (IC50 of 12.84 ppm), which approaches the IC50 value of vitamin C (6.98 IU), allowing it to be an excellent antioxidant source [12]–[20].

Jelly drinks commonly contain gelling agents and sweeteners. The thickener used in jelly drinks can be carrageenan, while the widely used sweetener is sucrose (cane sugar). Two sucrose functions make jelly drinks: a sweetener and a thickener, through the mechanism of withdrawal of free water molecules that can increase the solution's viscosity. However, in this study, sucrose is replaced with stevia due to its purpose to reduce risk factors for diabetes. The proper ratio of carrageenan and stevia needs to be studied to produce jelly drink that panelist prefer. Through the formulation variation of dragon fruit jelly drink that is enriched with jamblang leaf extract, we expected to observe the characteristics of color, aroma, texture, and taste preferred by panelists and also its antioxidants capacity [11], [21]–[25].

2 Materials and methods

2.1 Materials

The jamblang leaves were picked from the Garden of Research Center for Chemistry National Research and Innovation Agency (BRIN), Serpong, South Tangerang, Indonesia. Dragon fruit, stevia (new stevia), kappa carrageenan (miss ketto), citric acid (koepoe-koepoe from PT. Anggana Catur Prima – north Jakarta), and potassium citrate (royal canin) from local market. While materials for analysis included aquadest, buffer (pH 4 and 7), 0.1% NaOH solution, 95% ethanol, hexane, methanol, 1,1-diphenyl-2-picrylhydrazyl (DPPH) solution from Sigma Aldrich. Equipment for making jelly beverages include balance sheets, pans, stoves, stirrers, spoons, thermometers, fine filters, cups. The tools used for analysis include analytical balance (kern abj320), pH meter (Mettler toledo-seven easy), furnace (thermolyne 6000), oven (venticell), soxhlet, evaporator (BUCHI Rotavapor R-200), plate heater (Cimarec), spectrometers, filter paper, aluminum plates, porcelain cups, burettes, measuring cups, measuring flasks, volumetric pipettes, micropipettes, drop pipettes and tools for organoleptic testing.

2.2 Methods

Jamblang Leaf Maceration uses selected leaves that are not hollow and do not roll after the leaf sorting process is washed thoroughly and dried at room degree. The dried leaves were ground to sufficient particle size. Later, the dried leaves were submerged in water at a ratio of 1:10 at 100ºC. Then the extract is heated at 100ºC with an extraction time variation of 10-30 minutes. The extract was then filtered using a filter paper. A previous study demonstrated that the addition of 2 ml of jamblang leaf extract to 5 ml of liquid jelly was treatment with the highest acceptance from panelists(Angkasa & Sulaeman, 2008; Prasetia *et al*., 2020).

Dragon Fruit Juice is obtained using a method by [28]. The dragon fruits were washed then peeled to separate the flesh from the skin. The fruit flesh was cut into pieces then mashed with a blender. Then boiled water is added to the fruit juice at a ratio of 2:12 (w /v). The mixture formula between dragon fruit extract and jamblang leaf extract is determined based on antioxidant capacity and total flavonoids in the solution, namely the ratio of dragon fruit juice and extracts of 90:10, 80:20, 70:30, and 60:40. Samples with the highest antioxidant and total flavonoid results were selected as jelly samples because this study also focused on panelist preferences. Likewise, a hedonic test was performed on each extract mixture on 30 panelists. The selected extract mix formula is then made into a jelly drink by adapting Veronika and Sumarni [29]. The mixture of dragon fruit juice and jamblang leaf is heated to a temperature of 75ºC while being stirred. Then stevia (0.1%, 0.2% and 0.3%); carrageenan (0.2%, 0, 25% and 0.3%) and potassium citrate and citric acid (0.15%) were added.

2.3 Experimental design

This study's experimental design was a 3x3 factorial pattern in a randomized block design (RBD) and repeated three times to obtain 27 experimental plots. The combination of treatments can be seen in Table 1.

Table 1. Randomized design trial group matrix with a factorial pattern of 3x3 with 3 replications

Carragenan Concentration (A)	Stevia Concentration (B)	Group		
		1	2	3
A_1	B_1	A_1B_1(F1)	A_1B_1(F1)	A_1B_1(F1)
	B_2	A_1B_2(F2)	A_1B_2(F2)	A_1B_2(F2)
	B_3	A_1B_3(F3)	A_1B_3(F3)	A_1B_3(F3)
A_2	B_1	A_2B_1(F4)	A_2B_1(F4)	A_2B_1(F4)
	B_2	A_2B_2(F5)	A_2B_2(F5)	A_2B_2(F5)
	B_3	A_2B_3(F6)	A_2B_3(F6)	A_2B_3(F6)
A_3	B_1	A_3B_1(F7)	A_3B_1(F7)	A_3B_1(F7)
	B_2	A_3B_2(F8)	A_3B_2(F8)	A_3B_2(F8)
	B_3	A_3B_3(F9)	A_3B_3(F9)	A_3B_3(F9)

To prove the differences in the effect of the treatment and its interaction on all the characteristics of the observed variables, a data analysis with the following model was carried out:

$$Yijk = \mu + k + Ai + Bj + (AB)ij + \varepsilon ijk \quad (1)$$

where :

i = 1, 2, 3 (the number of carrageenan concentration variations, i.e. a1, a2, a3)
j = 1, 2, 3 (the number of stevia concentrations, i.e., b1, b2, b3)
k = 1, 2, 3 (number of replications / replications)
Yijk = Observation value in group i, which obtains level i from factor carrageenan concentration, level j from factor k concentration of stevia
μ = actual average value
Ai = Effect of carrageenan concentration treatment on the level of j factor carrageenan concentration
Bj = Effect of stevia concentration treatment on the i level of stevia concentration factor
(AB) ij = the effect of the interaction between the level of i carrageenan concentration factor and the level of j stevia concentration
εijk = effect of a trial error

2.4 Response design

Determination of water content using SNI [30] and pH referred to Angkasa and Sulaeman [26]. The characteristic physical analysis is comprised of the Syneresis method [31]. Sensory characteristics were tested through organoleptic tests to formulate selected jamblang dragon-leaf jelly drinks through a hedonic rating and rating test.

The hedonic rating test was conducted to determine the panelists' preference for the dragon fruit jamblang extract jelly, while the ranking test was carried out to find out the product most liked by the panelists. The panelist test was carried out on 40 untrained male and female sexes with an age range of 17-21 years. Panelists were asked to give characteristics to some of the attributes tested, namely color, aroma, taste, and texture with a scale of 7 preferred scale used, namely 1 = Very dislike, 2 = Dislike, 3 = Somewhat dislike, 4 = Somewhat like, 5 = Like, 6 = Really like, 7 = Very like. Furthermore, the panelists were directed to give preference to the products presented on a scale of 1 to 3, and the number 1 indicates the most preferred product while the number 3 indicates the product that is not liked.

3 Results and discussion

3.1 Determination of Jamblang Leaf Extract

The extracts were tested organoleptically with ten panelists limited to panelists [26] to formulate the dragon fruit jelly drink jamblang leaf extract. Making samples for organoleptic testing of samples is by mixing 2 ml of extract in 5 ml of plain jelly liquid so that the extract taste becomes lighter. The favorite results were ranked as listed in the following table:

Table 2. Rating of hedonic test of jamblang leaf extract

Extraction ratio	Extraction time	Ranking
1: 10	10 min	2
1: 10	20 min	3
1: 10	30 min	1

From these data, it was found that the most preferred flavor attribute of jamblang leaf extract was the extract with an extraction time of 30 minutes. Some panelists described that the extract exhibited a stronger taste than extracts from the two other maceration times and had a more tea-like aroma.

The longer the extraction time is expected to increase the number of bioactive substances in jamblang leaves. Simultaneously, the temperature of 100^{o}C is chosen based on the extraction process often done in traditional spices such as ginger and rosella for functional drinks (Purnomo et al., 2010).

3.2 Antioxidant Capacity and Total Flavonoid Extract

Jamblang leaf extract contains many phytochemical compounds, for instance, alkaloids, flavonoids, saponins, quinones, tannins, steroids, and polyphenols [17]–[20]. This affects the water extraction capacity of jamblang leaves. Antioxidant activity for jamblang leaf extract and dragon fruit juice is provided (Fig. 1). Preferred Mixture Test Results

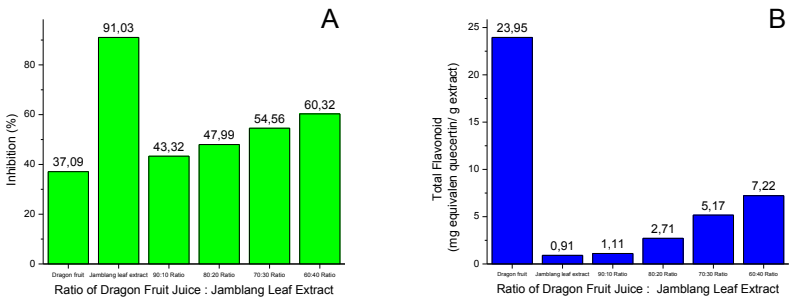

Fig. 1. Antioxidant activity (A) and total flavonoid (B) of the mixture of dragon fruit juice and jamblang leaf extract

The antioxidant testing results on jamblang leaf extract showed in Fig. 1A, the water extract from jamblang leaf had a high antioxidant activity (inhibition of 91%). In comparison, dragon fruit juice has an antioxidant activity of 37.1%. The graph obtained that the higher addition of jamblang leaf extract can increase the % inhibition of radicals given by the DPPH method. It can be seen that increasing the volume of jamblang leaf extract increases the antioxidant activity of the extract mixture. The lowest antioxidant activity was at the highest dragon fruit juice volume ratio at 90:10, with inhibition of 43.3%, while the most increased antioxidant activity was at the ratio with the lowest dragon juice volume of 60:40 with inhibition of 60.3%.

Fig. 1B illustrates a graph of flavonoid levels from a mixture of dragon fruit juice and jamblang leaf extract. The increasing jamblang leaf extract added increases the total flavonoids in the extract mixture. The formulation that contained the highest flavonoids was obtained at ratio of dragon fruit extract and jamblang leaf extract of 60:40 for 7.22 mg equivalent to quecertin/g extract, while the lowest in the mixture ratio of 90:10 with a total flavonoid of 0.88 mg equivalent to quecertin/g extract. Flavonoids in dragon fruit juice do not show high results due to flavonoids often in nature are concentrated in plant tissue, obtaining the relevant component of the flavonoid extraction process [7], [8], [33].

3.3 Preferred Mixture Test Results

In Fig. 2, It is found that panelists prefer formulas with a mixture ratio of 80:20. This is because the addition of jamblang leaves affects the taste in the extract mixture to become bitterer. The bitter taste in jamblang leaf extract is influenced by the flavonoid content contained in the extract. Some of the flavonoid compounds in nature have a bitter taste that resists certain types of caterpillars [17]–[20].

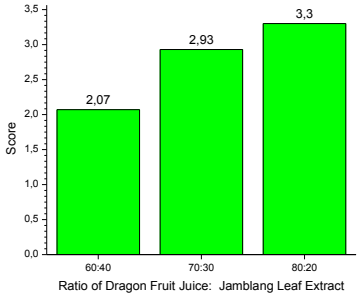

Fig. 2. Hedonic test results of the extract mixture

Based on the one-way Wallis Kruskall test results, the results of the samples tested have a significant difference ($p < 0.05$). Then the test continued using the Duncan test. From these results, it was found that the preference for the three formula ratios had significant differences between samples. The data results obtained that the panelists most liked the sample with an extract mixture ratio of 80:20, with an average value of 3.30 in the range of responses rather than dislike too somewhat like.

3.4 Effect of Carrageenan Stevia on the Characteristics of Jelly

ANOVA analysis of water content and stevia concentration resulted in a P-value> 0.05, which means no difference between stevia concentration and water content of the dragon-jelly fruit jelly leaves. But in Fig. 3A, it can be seen the trend that the higher the stevia content used results in lower water content values. This is because stevia has hygroscopic properties, namely the ability to bind water molecules to its environment, so the addition of stevia can reduce the water content of jelly drinks.

Based on ANOVA data results on the relationship of water content and carrageenan concentration, shown in Fig. 3B, the P-value> 0.05 indicated that the water content and carrageenan concentration were not significantly different. Carrageenan is a hydrocolloid that has the function of binding water in making jelly. But the addition of stevia to jelly drinks can increase the pH. This causes the ability of carrageenan in critical water to decrease. The gel formed from kappa-carrageenan is stable at acidic pH [11], [22]–[24].

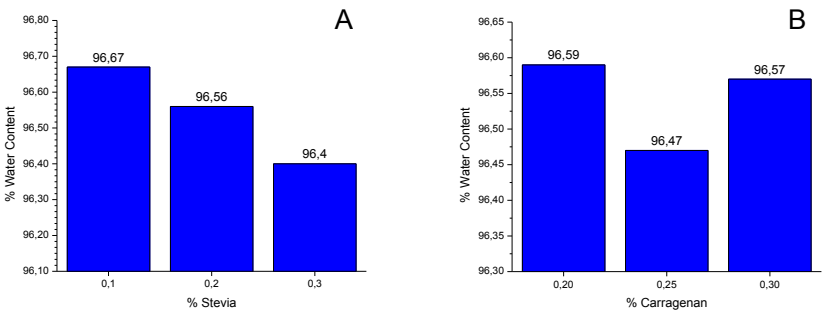

Fig. 3. Relationship of water content with stevia (A) and carrageenan (B)

Fig. 4 showed that the relationships between pH of stevia and carrageenan concentration obtained by ANOVA test results of P-value > 0.05. The histogram of pH means there is no

significant difference between stevia and carrageenan concentrations. However, Fig. 4A showed that the increase of stevia concentration increases the dragon fruit jelly drink's pH value - jamblang leaf extract due to commercial stevia generally has a pH value of 7.

While Fig. 4B showed that the jelly drink's pH ranges from 4.34 to 4.48, this value is included in the stable pH range according to Arini (2010) in the field of 3-5. The pH of jelly drinks is acidic because there is an effect of potassium citrate and citric acid. Potassium citrate provides potassium ions in jelly that function as retarders (chemicals that function to slow down chemical reactions) so that the gel becomes stable. The addition of potassium citrate will initially increase the gel's pH, then the addition of acids will reduce the pH to become more stable.

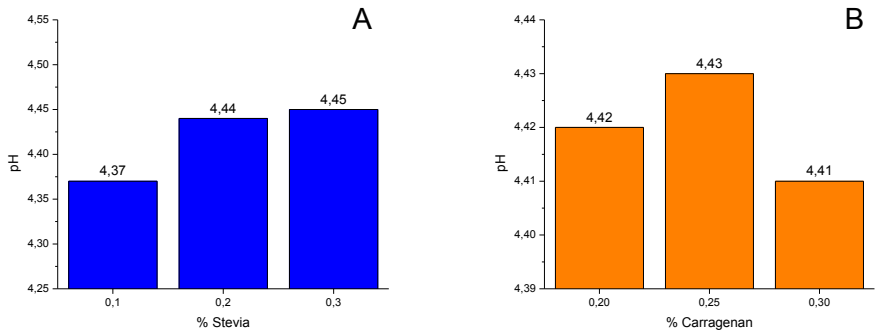

Fig. 4. Relationship of pH with stevia (A) and carrageenan(B)

3.5 Syneresis

Syneresis is the process of releasing water in the gel caused by contractions between gels due to the formation of new bonds between the polymers of the gel structure [11]. The results of the measurement of syneresis on the fifth day are available in Fig. 5.

ANOVA data results showed that the P-value> 0.05, which means that% of the syneresis of the dragon fruit jelly drink - jamblang extract with different carrageenan concentration, was not significantly different. Carrageenan functions as a hydrocolloid that can bind water and form a gel in the dragon fruit jelly drink extract jamblang leaves.

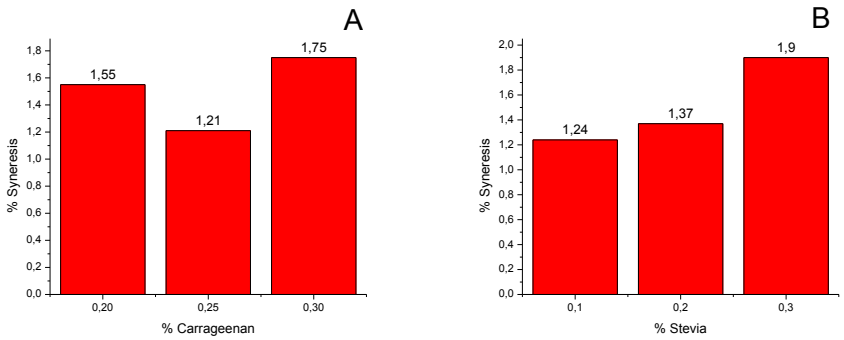

Fig. 5. Relationship of syneresis with carrageenan (A) and Stevia (B)

ANOVA data results showed that the P-value> 0.05 means that the% of the dragon fruit jelly drink's syneresis - jamblang extract with different stevia concentrations was not significantly different. However, in Fig. 5, it was found that the higher the concentration of

stevia used, the syneresis of jelly drinks increased. This is because stevia that is hygroscopic causes the binding of water molecules by carrageenan to be disturbed. The water molecules in the jelly drink extract of dragon fruit jamblang leaves become easily separated.

3.6 Hedonic Test Results of Dragon Fruit Jelly Extract

The results of the kruskal wallis test on the colors of the dragon fruit jelly drink - jamblang leaf extract showed a P-value> 0.05, which means, there was no difference in the color of the dragon fruit jelly drink - jamblang leaf extract (Fig. 6A). The color of the dragon fruit jelly drink extract from jamblang leaves is derived from the pigment that is in red, the anthocyanin pigment of dragon fruit extract (Mardina *et al*., 2016). The panelists' degree of color preference is in the formulation (F8) with an average value of 5.4 being in the like-to-like response. While, for texture, the results of the Kruskal Wallis test (Fig. 6B) show a P-value> 0.05, which means that there are significant differences in the texture of the panelists expected to expect different carrageenan and stevia concentrations used (Fig. 6B). Then a further test was done using the man Whitney u test, and it was found that the different values were only in formulation 5. In contrast, for the other sample, matters were not significantly different. And although not significantly different, it can be seen that preference trends increase in formulations F3, F6, and F9. Namely at the highest stevia concentration of 0.3%. The texture of the jelly drink is influenced by carrageenan concentration. The greater use of carrageenan will increase the gel's strength due to forming a stronger double helix bond [11].

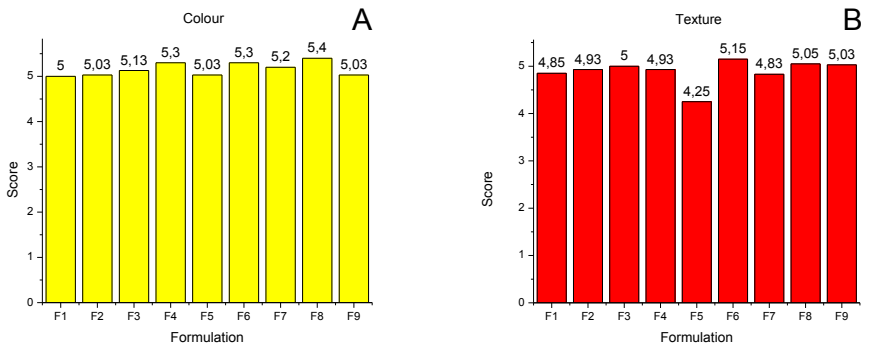

Fig. 6. Color preference (A) and the preferred texture result (B) for jelly drinks sample

The results of the Kruskal Wallis test of aroma (Scent) preferences (Fig. 7A) show values with a P-value> 0.05 which indicates that there is no difference in the panelists' choice for the aroma of jelly drinks with different concentrations of carrageenan and stevia. The favorite smell of jelly is found at 3.78 - 4.125 (rather like - like). The aroma of jelly drinks is influenced by dragon fruit juice and jamblang leaf extract. Dragon fruit juice gives the smell of jelly, while jamblang leaf extract gives a little tea aroma to the dragon fruit jelly drink - jamblang leaf, tea aroma on jamblang leaf extract is produced from tannin which is one of the active components in jamblang leaf extract (Marliani et al., 2014). On the Other hand, Taste is one of the essential things in food products. Generally, jelly drinks have a fruit flavor and are also fresh. In the Kruskal Wallis test, the taste attribute was P-value <0.05, which means that there were differences in panelists' preference for jelly drinks with different concentrations of carrageenan and stevia concentrations. From the Hedonic taste results in Fig. 7B. it is known that the highest value of flavor is found in sample F9, with a value of 3.95. The taste of the dragon fruit jelly drink - jamblang leaf extract is influenced by its ingredients, including dragon fruit, jamblang leaf extract, stevia, and citric acid. Panelists

stated that the formulation with the best taste had a fresh, sweet taste that was just right and a texture that could still be chewed.

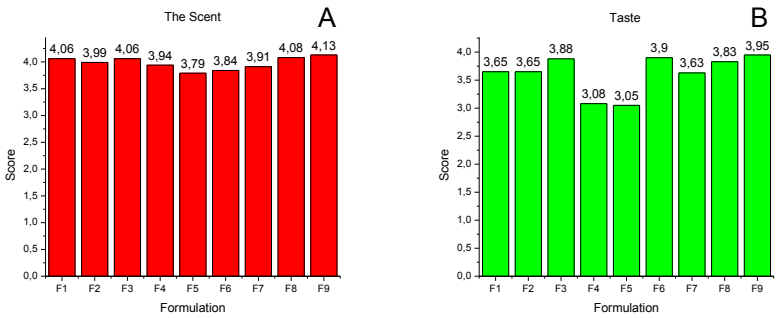

Fig. 7. The preferred result of the scent (aroma) (A) and taste (B) of jelly drink a sample

3.7 Ranking Test Results of Dragon Fruit Jelly Juice - Jamblang Leaf Extract

The choice of the dragon fruit jelly drink formulation - jamblang leaf extract is based on the rank test for all sample attributes, with a value of 9 being the most preferred sample and a value of 1 being the least preferred sample. The average total ranking obtained the highest average value is the sample formula F9 jelly (A_3B_3) with stevia concentration of 0.3% and total carrageenan of 0.3%, which means that the sample is the most preferred by panelists. The rank test results are available in Fig. 8. Jelly Jamblang leaves extract jelly drink are available in Fig. 9.

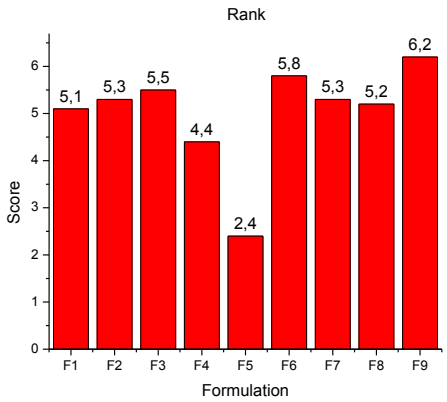

Fig. 8. Results of jelly drink ranking test

Fig. 9. Jelly Jamblang leaves extract jelly drink

3.8 Results of Quality Analysis of Dragon Fruit Jelly Jelly Extract

3.8.1 Antioxidant Activity

Antioxidant compounds are interpreted as electron donor compounds and biologically mentioned as a compound that can counteract or reduce oxidants' harmful effects by donating one electron to an oxidant compound to inhibit these oxidant compounds. Antioxidant activity was measured with the counting of amount intensity reduction of DPPH (1,1-diphenyl-2-picrylhydrazyl) purple color, proportional to the removal of DPPH solution concentration. The damping was generated by reacting molecules of DPPH with a hydrogen atom released from one molecular component of the sample to form compound diphenyl picryl hydrazine and caused occur changes of DPPH color from purple to yellow (Sundowo *et al.*, 2017; Azizah *et al.*, 2019). The antioxidant activity of jelly drinks is in% inhibition, with a % inhibition of 46.4%—Jelly drink. Antioxidant-rich drinks help a person maintain and maintain health because they can capture free radical molecules and ROS (Reactive Oxygen Species) so that they can inhibit oxidative reactions that cause degenerative diseases such as heart disease, stroke, and diabetes [4], [11], [21]–[25].

3.8.2 Total Flavonoids

Flavonoids have potential as an antioxidant and have bioactivity as a drug. Flavonoids are often concentrated in a particular tissue in plant parts such as leaves, fruit, and wood. Preliminary chemical examination indicated the presence of polyphenols and flavonoids, which might be responsible for antioxidant and antidiabetic (α-glucosidase inhibitory) activities [33]. Some studies have shown that flavonoids have hypoglycemic effects and have been shown to have beneficial effects against diabetes, either through their ability to reduce glucose absorption or increase glucose tolerance in the blood through increased insulin sensitivity. The results of testing the selected jamblang dragon fruit jelly drink obtained a total flavonoid value of 1.35 mg equivalent to quecertin /g.

3.8.3 Jelly Syneresis

From the results Fig. 10 of syneresis testing on selected samples found that the syneretic characteristics of jelly drinks tended to be stable, with% syneresis on the 5th day amounting to 1.146%. With increasing days, the percentage of syneresis from jelly drinks has increased; this is because there is a hydrolysis process of glycosidic bonds in carrageenan molecules, which causes carrageenan ability to bind water to decrease. The use of stevia in jelly drinks can make the gel in jelly more stable than using sugar. This is because stevia as a sweetener

only uses far more concentrations than caves in jelly drinks. The addition of high amounts of sugar can inhibit the formation of carrageenan gels so that the gel formed is too weak to bind water, hygroscopic properties of sugar can also absorb more water so that syneresis becomes higher [4], [11], [21]–[23].

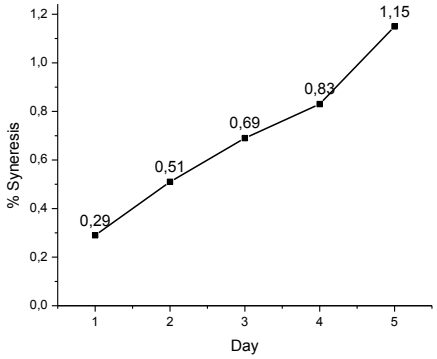

Fig. 10. Results of syneresis analysis on the 5th day

Water content analysis is performed to determine the water content in food. Water content in food can affect appearance, texture, and taste. Water content analysis was performed using the thermogravimetric method using an oven, and the results obtained were 96.15% of dragon fruit jelly extract. Sample water content is available in Table 3.

Table 3. Proximate analysis results of selected jelly drinks

Parameters	Unit	Result
Water content	g	96,15
Total Fat	g	1,1
Ash	g	0,18
Protein	g	0
Total Sugar /Carbohydrate	g	37,1

Testing the total fat content in the dragon fruit jelly extract of jamblang leaf extract was carried out using the Soxhlet method using hexane solvent. The test results obtained, the fat content of dragon fruit jelly drink extract jamblang leaves by 1.1%.

The Ash content of food represents the value of minerals in food. The ash analysis process in this study uses a dry ashing method using a kiln. The ash analysis results obtained on dragon fruit jelly drinks samples - jamblang leaf extract were 0.18% (Table 3). The mineral sources in the dragon fruit jelly drink extracts of jamblang leaves include potassium citrate and citric acid added as a gel stabilizer. The protein content of the sample of the dragon fruit jelly drink extract jamblang leaf was analyzed using the CHN method. From the analysis results obtained, the results of protein content samples of dragon fruit jelly drink extract jamblang leaves by 0%.

The total sugar/carbohydrate content of the dragon fruit jelly extract, jamblang leaf extract was analyzed using the anthrone-sulfate method. Carbohydrate samples are reacted with

Anthrone, 9.10 dehydro-9 ketoanthrone, which will form a greenish-blue color. Then the color created is measured by absorption with a spectrophotometer at a wavelength of 630 nm.

The test results obtained the total sugar samples of dragon fruit jelly extract jamblang leaves by 0.1 mg glucose / ml or by 37.1%. Regulation of the head of the Republic of Indonesia drug and food regulatory agency number 13 of 2016 concerning supervision of claims on processed food advertisement labels BPOM [39] states that the claim of "low sugar" on a food product in liquid form is 2.5 grams per 100 ml, while the product dragon fruit jelly drink - jamblang leaves have a sugar content of 0.1 mg glucose / ml equivalent to 10 mg glucose / 100 ml or 0.01 gram glucose / 100 ml. So, this product meets the low sugar claim (Table 4).

Table 4. Calculation of total calories of selected jelly drinks

Macronutrient	Total/100g sample	Calorie/g	Calorie/ 100g
Carbohydrate	37,1	4	148,4
Protein	0	0	0
Fat	1,1	9	9,9
Total Calorie			**158,3**

The daily calorie needs are relatively low compared to the daily calorie needs in adults, generally by 2000 calories, and the average individual minimum calorie needs of 1800 calories. But the actual caloric needs of each person vary depending on body weight, height, age, and physical activity in that person.

4 Conclusion

Different concentrations of carrageenan and stevia in the manufacture of jelly drinks do not make the characteristics of syneresis, pH, and jelly drinks' water content significantly different. Through the hedonic test, the rating showed that panelists liked the F9 formulation the most, namely the formulation of dragon fruit juice extract and jamblang leaf extract of 80:20 and stevia and carrageenan concentrations of 0.3% and 0.3%, respectively. Through product quality analysis, the results of the jelly-jelly leaf extract have antioxidant activity with% inhibition of 46.4% and total flavonoids of 1.35 mg equivalent to quecertin/g, and proximate analysis of 96% water content, fat content 1, 1%, 0% protein content, 37.1% total sugar, and 0.18% ash. The panelists preferred beverages with a red color, a jelly-like aroma, a fresh taste, an appropriate level of sweetness, and a chewable texture.

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