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RESEARCH ARTICLE

ACCEPTABILITY, CALCIUM LEVEL AND ANTIOXIDANT ACTIVITY OF INSTANT DRINK POWDER OF SUGAR PALM FRUIT (ARENCA PINNATA, MERR) WITH SOURSOP (ANNONA MURICATA,L) FLAVOR.

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Key words:-

Acceptability, Antioxidant Activity,
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 fruit, Soursop

Abstract

This research aims to study the formulation of instant drink of sugar palm fruit with soursop flavor. This study was conducted in laboratory of Agricultural Technology, Andalas University. This study used a completely randomized design (CRD) with 5 treatments and 3 replications. Analysis of the data used Analysis of Variants (ANOVA), followed by Duncan's New Multiple Range (DNMRT) at the 5% significance level. The treatments was the mixture of sugar palm fruit powder and soursop powder with ratio : A (100%: 0%), B (85%: 15%), C(80%:20%), D(75%:25%) and E(70%:30%). The result showed that the mixing of palm sugar fruit powder and soursop powder gave a significant effect on water content, vitamin C, calcium and antioxidant activity. The results showed that treatment D (75% of sugar palm fruit powder : 25% of soursop powder) is the most preferred products with a value of appearance 3.23 (like), aroma 4.01 (like) and taste 3.26 (like). With a water content of 7.34%, antioxidant activity of 37.74%, vitamin C of 13.34 mg / 100g, Calcium of 47.33 mg / 100g.

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Introduction:-

Lots of fresh fruit that can be used to make the instant drink one of the fruit is sugar palm fruit. Sugar palm fruit widely produced but still a bit of it which processed. Sugar palm fruit comes from the sugar palm plant that contains energy, fiber, calcium and a pretty high vitamin. sugar palm fruit rich of minerals such as calcium, iron and high fosfor. Pectin in sugar palm fruit is very helpful to accelerate satiety and stop appetite, making it suitable as a diet food. Fibers in sugar palm fruit also help the process of defecation regularly (Ratima, 2014) [1].

These days, sugar palm fruit only processed into sweets, mixed in fruit ice syrup, sekoteng, made compote or an addition of other sweet foods. To make the shelf lifelonger we need to do the processing, sugar palm fruit can be processed into a form of instant powder drink. Disadvantages of sugar palm fruit is it does not have a distinctive aroma and has a bland taste if consumed directly, so it is necessary to add flavors of other fruits like soursop, soursop has a sweet sour taste that provide sensation and flavor. Besides the addition of soursop is expected to add nutrients in instant powder drink of sugar palm fruit that produced..

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Materials and Methods:-

Place and Time:-

This research was conducted at the Research Laboratory of Technology and Engineering, Biochemistry and Nutrition of Agricultural Products and Laboratory of Microbiology and Biotechnology Department of Agricultural Technology Faculty of Agricultural Technology, Andalas University.

Materials and Equipment:-

The main material used is sugar palm fruit (*Arengapinnata*, Merr) and soursop (*Annona muricata*, L) obtained from Grand Market in Padang. Additional materials used were sucrose as a sweetener and maltodextrin obtained from Bratachem, Padang. For chemical analysis needed distilled water, Saturated Ammonium Oxalate, acetone, methyl red indicator, dilute acetic acid, sulfuric acid, KMnO_4 0.1N, Concentrated H_2SO_4 , Alcohol 95%, 0.01 N iodine solution, starch or starch indicator 1%.

Equipment: blender, oven, spray dryers, pan, vacuum filter, analytical balance, porcelain bowls, beakers, erlenmeyer, aluminum bowls and goblets.

Research Design:-

The design used in this study was completely randomized design (CRD) with 5 treatments and 3 replications. Data were analyzed using analysis of variance and continued by Duncan's New Multiple Range Test (DNMRT) at 5% level.

Factors treatment is the concentration of soursop extract. Following are the treatments, formulas and mathematical models:

- A: 100% sugar palm fruit powder : 0% soursop powder
- B: 85% sugar palm fruit powder : 15% soursop powder
- C: 80% sugar palm fruit powder : 20% soursop powder
- D: 75% sugar palm fruit powder : 25% soursop powder
- E: 70% sugar palm fruit powder : 30% soursop powder

Table I:-Formulation of Instant Drink Powder of Sugar Palm Fruit with Soursop Flavor

Materials	Treatments				
	A	B	C	D	E
Sugar Palm Fruit Powder (g)	100	85	80	75	70
Soursop Powder (g)	0	15	20	25	30
Sugar (g)	5	5	5	5	5

Implementation:-

Making of sugar palm fruit powder:-

Weighed and washed sugar palm fruit then blended with water at a ratio of 1: 2. Add maltodextrin 20% on sugar palm fruit pulp and homogenized. Then dry in oven with a temperature of 50°C for 24 hours. Then grind and sieved to 80 mesh sieve..

Making of Soursop Powder:-

Soursop peeled and washed then took out the seeds and blended with water at a ratio of 1: 3 and then filtered by vacuum filtration and the filtrate added with maltodextrin 20% and homogenized. Then dried using a spray dryer at an inlet temperature of 150°C and an outlet temperature of 70°C.

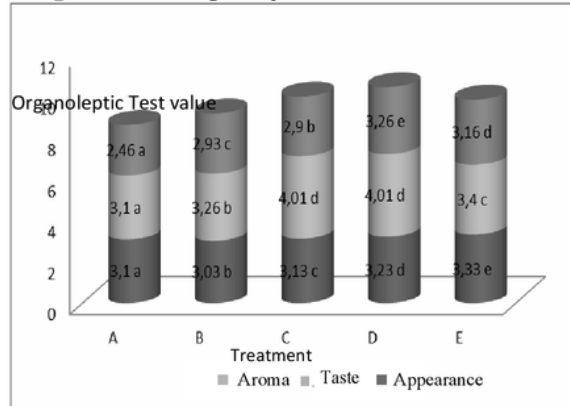
Making of Instant Drink Powder:-

Sugar palm powder, soursop powder and sugar weighed base on each treatment, then all mixed until evenly distributed.

Observation:-

Figures Organoleptic test of instant drink by panelist including appearance, aroma and flavor (Soekarto, 1981) [2]. Chemical Analysis done on product A (as a control) and two best product based on organoleptic test, including moisture content (Yenrina, et al., 2011) [3], calcium level (Apriyantono, et al, 1989) [4], vitamin C (Yenrina et al, 2011) [3] and antioxidant activity (Huang, et al, 2005) [5]

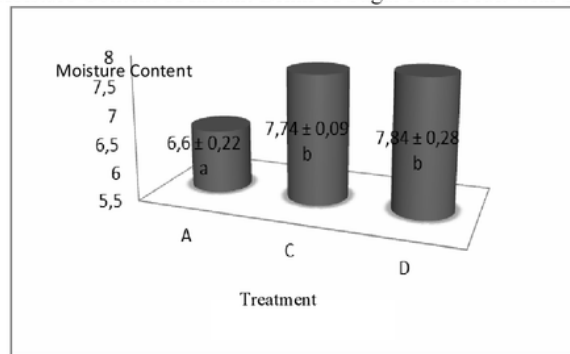
Fig 1:-Chart of Organoleptic Test Results of Instant Drinks.



Organoleptic value ranged from 1 to 5, with 1 = strongly dislike, 2 = dislike, 3 = neither like nor dislike, 4 = like and 5 = really like

The numbers on the same lane followed by lowercase letters are not the same, according to DNMRD significantly different at 5% significance level.

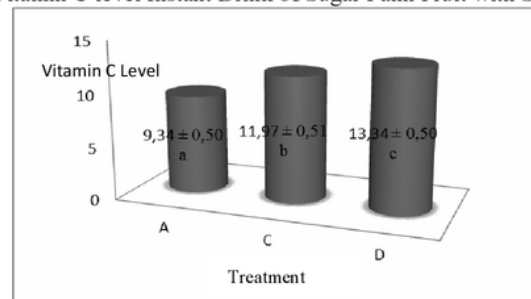
Fig 2:-Moisture Content of Instant Drink of Sugar Palm Fruit with Soursop Flavor



*Values are mean ± standard deviation

The numbers on the same lane followed by lowercase letters are not the same, according to DNMRD significantly different at 5% significance level.

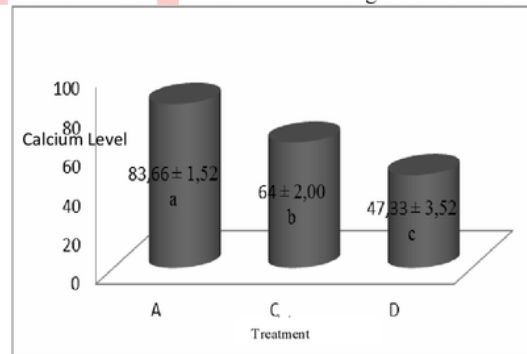
Fig 3:-Vitamin C level Instant Drink of Sugar Palm Fruit with Soursop Flavor



* Values are mean ± standard deviation

The numbers on the same lane followed by lowercase letters are not the same, according to DNMRD significantly different at 5% significance level.

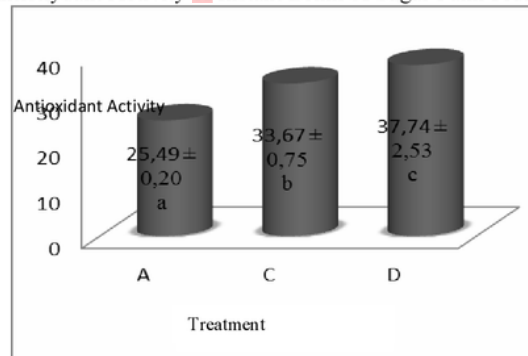
Fig 4:-Graphic of Calcium Level of Instant Drink of Sugar Palm Fruit with Soursop Flavor.



* Values are mean ± standard deviation

The numbers on the same lane followed by lowercase letters are not the same, according to DNMRD significantly different at 5% significance level.

Fig 5:-Graphic of Antioxydant Activity of Instant Drink of Sugar Palm Fruit with Soursop Flavor



* Values are mean ± standard deviation

The numbers on the same lane followed by lowercase letters are not the same, according to DNMRD significantly different at 5% significance level.

Results And Discussion:-

Organoleptic value of products base on organoleptic test by 30 panelist obtained as in Fig 1.

Appearance: Based on the result of organoleptic test known that instant drink products of all treatments are preferred by the panelists. Product E (addition of 30% soursop powder) had the highest value of appearane with an average of 3.33 while the lowest was treatment of B (addition of 15% soursop powder) with an average of 3.03.

Category of scoring in appearance test of instant drink was the presence of insoluble particles in instant drink that produced. The higher the addition of soursop powder in instant drink of sugar palm fruit, the more insoluble particles present in instant drink, while the appearance of instant drink became more bright and not too thick. Results of analysis of variance concluded that the addition of soursop powder gives a significant effect on the appearance acceptance at level of 5%. As it seen in Fig 1, The higher the addition of soursop powder the higher the acceptance of appearance bypanelists.

Aroma: Based on organoleptic test of aroma, the most preferred product by the panelists was treatment C (addition of 20% soursop powder) and treatment D (addition of 25% soursop powder) with an equal value of 4.01. The addition of soursop in the making of drinks can give flavor to instant drink that produced.

The resulting aroma of instant drink is a fresh sour aroma caused by the addition of soursop powder. Soursop contained of aromatic compound (El Hadi, 2013) [6] so the higher the addition of soursop powder then the more distinctive aroma of instant drink that produced, the best result was at the addition of 20% and 25% soursop powder while the addition of 30% soursop powder the acceptance are decreased because of aroma became too sharp.

Taste: Based on organoleptic test of taste, the most preferred product by the panelists was treatment D (addition of 20% soursop powder) with an average value of 3.26.

The flavor of instant powder drink that produced derived from an organic acid non-volatile particularly malic acid, citric acid and acid isositrat found in soursop (Mardiana and Juwita, 2011) [7], besides sugar also acted as a binder component of flavor and enhance sour taste and flavor (Oktaviani2012) [8]. The taste of instant drink that produced was sweet and sour taste caused by the addition of soursop powder. Addition of 30% soursop powder had a decreased acceptance of taste because the sour taste was toodominant.

Based on organoleptic test results showed in Fig 1, it can be concluded that the most preferred treatment by panelists was treatment D (addition of 25% soursop powder). Followed by treatment C (addition of 20% soursop powder)

Chemical Analysis:-

Moisture Content: The results of the analysis of water content in instant powder drink ranged between 6.60% - 7.84%. Analysis of moisture content can be seen in Fig 2.

Based on the analysis of variance known that addition of soursop powder statistically had significant effect on the Moisture content of instant powder drink at the real level $\alpha= 5\%$. The higher the addition of powder soursop the higher water content of the product it is caused by soursop powder has a fairly high water content and also due to the presence of water bound in the product and also of not reaching a drying temperature that is appropriate to the nature and type of material. Instant drink that produced does not meet SNI of instant powder drink (01-4320-1996) [9] of 3-5%.

Vitamin Cleve : Analysis results of Vitamin C level of instant drink that produced can be seen in Fig 3.

Based on the analysis of variance known that addition of soursop powder statistically had significant effect on vitamin c of instant powder drink at the real level $\alpha= 5\%$. According to Mardiana and Juwita (2011) [7] soursop is rich in vitamin C, so that the results of research showed The higher the addition of powder soursop the higher water content of the product where soursop contains of vitamin C 20 mg (DepKes RI, 1992) [10] in form of ascorbic acid and L-dehydroascorbic acid.

Calcium Level: Analysis results of calcium level analysis of instant powder drink that produced can be seen in Fig 4.

Results of analysis of variance showed that the addition of soursop powder statistically had significant effect on calcium level of instant drink. The higher the addition of powder soursop, the lower the calcium content of the instant drink. This is due to the high content of calcium in sugar palm fruit of 91 mg / 100 g of material (Ratima, 2014) [1] while the calcium content in soursop of 14 mg / 100 g materials (DepKes RI, 1992) [10]. So the more addition of soursop powder used will reduce Calcium level of instant drink.

Antioxidant Ativity By DPPH: Analysis result of antioxidant activity of instant drink showed in Fig 5.

From the analysis of variance showed the addition of soursop powder statistically had significant effect on Antioxidant Activity of instant drink. The highest antioxidant activity obtained in treatment D (addition of 25% soursop powder) of 37.74% and the lowest one obtained in treatment A (without addition of soursop powder) of 25.49% at a concentration of 100,000 ppm. According to Mardiana and Juwita (2011) [7] soursop are also rich in phytochemical compounds such as flavonoid, it can benefit for health. Flavonoids are known as one of the antioxidant substances which is so strong that it can eliminate the damaging effects of oxygen in human body (Sunami, 2007) [11] The higher the addition of soursop powder, the higher the antioxidant activity in instant drink.

Conclusion:-

1. The best product based on organoleptic test is treatment D (addition of 25% soursop powder) where the value of appearance of 3.23, aroma 4.01 and taste of 3.26 with chemical analysis values : moisture content of 7.84%, antioxidant activity of 37.74%, vitamin C of 13.34 mg / 100 g and calcium 48 mgCa / 100 g material.
2. The addition of soursop powder in the making of instant powder drink gives significant effect on water content, vitamin C, calcium and antioxidant activity.

Suggestion:-

Recommended for next researchers to use other drying method in the making of instant drink sugar palm fruit and soursop in order to get the water content in accordance with SNI and to analyze the shelf life of the product.

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