

The Effect Dextrins Concentration and Duration of Drying Times on Quality Passion Fruit Instant

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Abstract: *The effect dextrins concentration and duration of drying on instant quality passion Fruit . The research aims to determine the effect of dextrin concentration and duration of drying time to changes in vitamin C, acids total, rendement, solubility in water, water content and organoleptic value on instant passion fruit juice. This research was conducted by completely randomized design (CRD) factorial with two treatments, namely: Factor I: The concentration of dextrin with a password C, consisting of 4 levels namely: 15%, 30%, 45% and 60%. Factor II: drying with consisting of a 4 level namely: 10 hours, 20 hours, 30 hours and 40 hours. The research results show that the concentration of dextrins gives highly significant effect ($p < 0.01$) against the value of the rendement, solubility in water, the water content, vitamin C, total acid, rendement abu and organoleptic value. The higher the concentration of dextrin then rendement, solubility in water, vitamin C, total acid and ash content is increasing, while the water content decreases. Organoleptic value increases to 45% dextrin concentration and decreases in concentrations of 60%. Long drying highly significant effect ($p < 0.01$) on the value of the rendement, solubility in water, water content, vitamin C, total acid, ash content and organoleptic value. The longer drying then solubility in water and ash content increased, while the rendement, water content, levels of vitamin C and total acids decreases. Organoleptic value increases to 30 hours drying time and decreasing the drying time of 40 hours. Quality powdered instant passion fruit are best obtained at a concentration of 45% dextrin and duration of drying time of 30 hours, because it has the highest organoleptic value.*

Keyword: *dextrins, passion fruit extract, instant powder drinks, quality*

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I. Introduction

Passion fruit is a horticultural plant which has long been cultivated in Indonesia. This commodity is cultivated people because it has a high economic value and that is unbelievably bright prospects. Passion fruit is rich in color and distinctive flavor and rich in vitamins, especially vitamin C and vitamin A. Passion is horticulture commodity that properties which is easily damaged and can be retained for long in a fresh state, whereas in general the producer farmers market this fruit in a state of passion fresh, this leads to unwanted price fluctuations by the passion fruit the fruit famer market producer is in a fresh state, this causes unwanted price fluctuations by peasant producers [1,2].

Nutrisari is an instant beverage the ingredient of which derived from the synthesis and is formulated in such a way. The label located on the packaging, it appears that its content is made of fresh citrus fruit, it is very worrying to health. Passion fruit juice processing is quite simple, so it can be done by home industry. But for the purpose of export, passionfruit industry should be able to maintain the quality and hygienic condition. This can not be done by home industry. Exports carried out in South Sulawesi is in the form of juice which is still mixed fruit (pulp). The process is quite simple, passion fruit is put into plastic or specific containers and immediately frozen (block quick freeze), and then stored in cold storage while awaiting for shipment to be exported [5,6].

Organic acids are important constituents of solid material that is dissolved (soluble solid) in passion fruit juice. Organic acids is what determines the nature of the acidity of the juice of passion that affect taste. Vitamin C is a nutrient and water-soluble vitamins and essential to life and to maintain health. This vitamin is also known by the chemical name of its main form of ascorbic acid. Antioxidants is categorized into vitamin C group because it is very easily oxidized by heat, light, and metal, therefore the use of vitamin C as an antioxidant more is often encountered [8,11].

Dextrin is a material that is safe to use, non-toxic and not harmful for human consumption. Dextrin is used to improve the appearance and composition of products in it that it is often used in mix powdered

beverages, confectionery and an assortment of cakes. Dextrin can absorb and bind water contained in the material and including binding organic substances, it will increase the ash content of a material. Dextrin can tie organic acid and that it can retain in the product and improve the appearance of the product and maintain the composition of biological materials. Sucrose in this product not only give sweetness alone though these properties are essential, butb can also bind vitamin C and are perfect sour of taste and flavor, the beverage because it provides consistency in beverage form. While the drying is done with the aim to make it more resistant stored in a long term [9,10].

The consumers really want to consume fruit juice instantly in which is similar the same taste as fresh fruit juice. Instant food product has several advantages such as shelf life is relatively longer, practical, smaller storage volume and distribution costs are relatively cheaper. Based on the above fruits, the authors are interested in doing a research do to reveal the effect of concentration of dextrin and the duration of drying on making fruit passion instan

II. Material and Methods

2.1. Materials

The research material is passion fruit (*Passiflora edulis* SIM) obtained from passion fruit market in which the fruit has been physiologically mature and uniform, no defects and has generated a specific scent, sugar, dextrin obtained from Sports Happy Tanjung Sari Medan. The chemical sieves are as follows: Starch, Iodine, phenolphthalein, NaOH, KOH and H₂SO₄.

2.2. Methods

This study uses a Completely Randomized Design (CRD) This study was conducted by CRD factorial with two treatments, namely: Factor I. Dextrin password-C concentration, consists of 4 levels namely: C₁ = 15%; C₂ = 30%; C₃ = 45%; and C₄ = 60%. Factor II. The duration of drying time with a password T, consisting of 4 levels that: T₁ = 10 hours; T₂ = 20 hours; T₃= 30 hours and T₄ = 40 hours. The procedur of research in order with Fig.1.

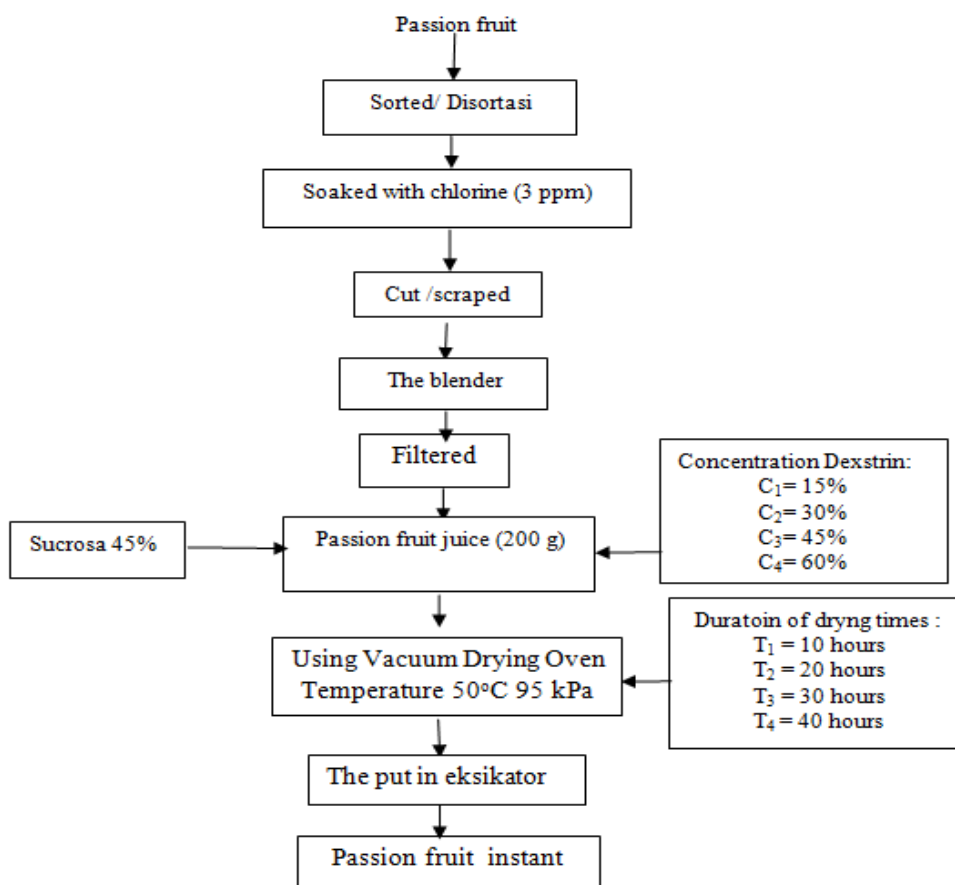


Fig 1. Flow Chart of Research

Passion fruit instant quality analyzed with vitamin C, acid total, rendement, water content, ash content, solubility in water and sensory properties.

2.3. Analysis of Vitamin C

10 ml powder material is taken and then inserted into the flask (100 ml plus distilled water up to the mark then shaken, and then filtered with filter paper). The filtrate was taken 10 ml Erlenmeyer and then inserted into 3 drops of 1% starch. Titrated with 0.01 N iodine solution until the color changes into a bluish. 1 ml iodine 0,01 N = 0,88 mg Vitamin C analyzed according to the method of AOAC 2006 [3]

2.4. Water Content and Ash Content

Water and ash content analyzed according to the method of AOAC 2006 [3]

2.5. Solubility In Water

Weighed 1 g of material and dissolved in 10 ml of distilled water in 50 ml beaker. The solution is then filtered with filter paper that has been known its weight, (previously dried first filter paper in the oven with the temperature 105°C for 30 minutes. Then the filter paper and its contents were dried in an oven at a temperature 105°C until a constant weight [4].

2.6. Rendement

After the drying completed, the constant weight is measured and the rendement percentage [4]

2.7. Total acids

Determination of total acid can be done by 10 ml sample plus 2-3 phenolphthalein indicator drops 1% and then titrated using 0.1 N NaOH until the titration end point is reached, in which pink is formed permanently. The total of acid is calculated as percentage of lactic acid [4]

2.8. Organoleptic Value

Organoleptic assessment value is based on the sensory value based on the senses (appearance and flavor). Organoleptic assessment is performed by weighing as much as 5 g material and dissolved in 150 ml of water. In the organoleptic test samples for color and flavor by using hedonic test method (hedonic with scale 1-5), where samples are presented randomly to the panelists as many as 15 people. Each panelist giving value to the color and flavor. Total value of the panelists determines the quality of the material being tested. Values given are the following panelists.

III. Results and Discussion

3.1. Rendement

The effect of dextrin concentration on the rendement of fruit passion instant

From the table, it can be seen that the concentration of dextrin give highly significant effect ($p < 0.01$) against the value of the yield on the quality of instant passion fruit juice powder. In table 1, it can be seen that the treatment with C_3 and C_4 , C_1 and C_2 between the treatment with C_3 and C_4 highly significant ($p < 0.01$), whereas the treatment with the C_1 C_2 , C_3 to C_4 were significantly different ($p < 0.05$). While the C_3 to C_4 treatment had no significant ($P > 0.05$). The highest value of rendement in the C_4 treatment amounted to 52.78% and the lowest in treatment at which amount to 32.90% C_1 . The higher the concentration of dextrin then the value of the yield will increase. This is because the dextrin will bind strongly to molecules including vitamin C and total dissolved solids [7].

Table 1. The Effect Concentration Against Dextrin Parameter Observed

Concentration Dextrin (%)	Rendement (%)	Water Content (%)	Solubility In Water (%)	Vitamin C Content (%)	Acid Total (%)	Ash Content (%)	Organoleptic value (%)
C_1 (15)	32,90	7,94	54,88	78,32	0,59	0,50	3,18
C_2 (30)	39,28	6,20	56,50	85,69	0,76	0,76	3,22
C_3 (45)	48,62	4,88	58,63	94,93	0,89	0,81	3,26
C_4 (60)	52,78	4,10	75,00	101,42	0,99	1,17	2,83

The effect duration of drying times on rendement fruit instant passion.

From table 2, it can be seen that the length of drying gives highly significant effect ($p < 0.01$) on the yield value quality instant passion fruit juice. In table 2, it can be seen that among treatments T_1 , T_2 , T_3 and T_4 there is highly significantly ($p < 0.01$), among T_1 to T_2 and T_3 were significantly different ($p < 0.05$), whereas the C_1 T_1 with no significant ($P > 0.05$). The highest value of the rendement in the treatment T_1 amounting to 47.90% and the lowest in T_4 treatment amounting to 39.20%. The longer the drying the yield value quality instant passion fruit juice will decrease. During the drying process takes place, occurs evaporation of water from the fruit juice instant. Evaporation of water results in a water content of the material decreases. The longer the

drying time is used, then the lower water content and reduce the weight of the material, so that the yield value of the resulting product will decrease [7].

Table 2. Effect of duration of drying times on parameters observed.

The drying long time (hours)	Rendement (%)	Water Content (%)	Solubility In Water (%)	Vitamin C Content (%)	Acid Total (%)	Ash content (%)	Organoleptic value (%)
T ₁ (10)	49,90	7,07	57,25	135,96	0,88	0,66	3,02
T ₂ (20)	45,32	6,47	61,13	105,93	0,83	0,74	3,18
T ₃ (30)	41,16	5,23	62,25	73,26	0,76	0,88	3,45
T ₄ (40)	39,20	3,73	64,38	45,21	0,67	0,97	2,83

3.2. Solubility In Water

The Effect of dextrin Concentration on Solubility In Water at Sari Passion Fruit Quality Instant

From Table 1, it can be seen that the concentration of dextrin gives highly significant effect ($p < 0.01$) on the solubility in water quality powdered instant passion fruit juice. In table 1, it can be seen that the treatment C₄ to C₁, C₂ and C₃ highly significant ($p < 0.01$), whereas the treatment with the C₁, C₂ and C₃ were significantly different ($p < 0.05$). While the treatment with the C₁, C₂ and C₃ had no significant ($P > 0.05$). The highest water solubility found in C₄ treatment by 75.00% and the lowest in the treatment of C₁ by 54.88%. It can be seen that the higher the concentration of dextrin, the solubility in water will increase. This is because the dextrin can bind water in the form of strong ties. The chain length reduction will lead to changes in properties where the starch is not soluble in water is converted into soluble dextrin. With increased concentration of dextrin, it will be the more instant passion fruit juice that is bound with water, there by increasing the solubility [10].

The effect of length of times of drying on solubility in water quality fruit passion instant

From table 2, it can be seen that the long drying gives highly significant effect ($p < 0.01$) on the solubility in water quality instant passion fruit juice. In table 2, it can be seen that among of treatments T₁, T₂, T₃ and T₄ were significantly different ($p < 0.05$), whereas T₂ to T₃ and T₄ had no significant ($p > 0.05$). Water solubility is highest in T₄ treatment by 64.38% and the lowest in treatment amounted to 57.25% C₁. The longer the drying the water solubility in the quality of instant passion fruit juice will increase. During the drying process, the water contained in the materials will be evaporation together with the volatile components contained in the passion, so that the water levels will be even lower. Low moisture content material, when dissolved in water, the solubility of the material will be higher, due to the material binding the water [8,11].

3.3. Water Content

The effect of dextrin concentration on water content passion instant.

From table 1, it can be seen that the concentration of dextrin give effect highly significant ($p < 0.01$) on water content in juice quality passion instant. In table 1, it can be seen that the treatment with C₃ and C₄, C₁ and C₂ treatment with C₃ and C₄ highly significantly ($p < 0.01$), whereas the C₁ to C₂ among of treatments significantly different ($p < 0.05$). While the C₂ to C₃ treatment had not significantly ($p > 0.05$). The highest water content contained in the C₁ treatment by 7.94% and the lowest in treatment amount to 4,10% C₄. It can be seen that the higher the concentration of dextrin then water levels will decrease. This is because the dextrin can absorb the water contained in the material, which has the properties as a towing dextrin water from the network [9].

The duration of drying times effect on the quality of water content fruit instant Passion.

From table 2, it can be seen that the long drying gives highly significant effect ($p < 0.01$) on water content in the quality of instant passion fruit juice. In table 2, it can be seen that the treatment T₁ with T₃ and T₄ and between T₂ treatment with T₃ and T₄ highly significant ($p < 0.01$), whereas treatment between T₁ and T₂ were significantly different ($p < 0.05$). While the treatment of T₁ to T₂ no significant ($p > 0.05$). The highest water content contained in the treatment T₁ amounted to 7.70% and the lowest in T₄ treatment amounted to 3.73%. The longer drying the water content at the instant passion fruit juice will decrease. The longer the drying, the more also the amount of water to be evaporated from the surface of the material [7].

3.4. Ash Content

The effect of dextrins concentration on ash content fruit passion instant.

From table 1, it can be seen that the concentration of dextrin give effect highly significantly effect ($p < 0.01$) to the abu content in instant passion fruit juice quality. In table 1, it can be seen that the treatment C₄ to C₁ and C₂ and between C₃ treatment with C₁ and C₂ highly significant ($p < 0.01$), whereas among treatments C₃ to C₄ were significantly different ($p < 0.05$). While the C₂ to C₃ treatment had no significant ($p > 0.05$). The highest ash content contained in C₄ treatment amounted to 1.17% and the lowest in treatment C₁ of 0.50%. It can be seen that the higher the concentration of dextrin then ash content will increase. This is because the

dextrin can bind water and contain a variety of minerals and other organic substances. In the presence of organic substances, it will increase the ash content of a material. The more concentration was given, the more the ash content in the material obtained food.

The effect duration of drying times on the quality of fruit ash content instant passion.

From table 2 it can be seen that the long drying gives highly significant effect ($p < 0.01$) to the abu content in instant passion fruit juice quality. In table 2, it can be seen that among of treatments T_1 , T_2 , T_3 and T_4 were significantly different ($p < 0.05$). While the treatments T_2 to T_3 and T_4 had no significant ($p > 0.05$). The highest ash content contained in the treatment T_4 0.97% and the lowest in treatment T_1 by 0.66%. The longer drying the abu content in instant passion fruit juice powder. A large number of abu content obtained depending on the type of material that to abu. The longer the drying, it will reduce the water content. The more moisture from the waste material, it will increase the ash content of a material. The ash content depends on the type of material, means of ashing, the time and temperature used in drying. The higher the drying time will increase the ash content, because the water that comes out of the material increases.

3.5. Total Acids

The effect of total acid concentration dextrin at passion fruit quality instant

From table 1, it can be seen that the concentration of dextrin give highly significant effect ($p < 0.01$) against total acid on the quality of instant passion fruit juice. In table 1, it can be seen that the treatment C_4 to C_1 and C_2 , and C_3 treatment among of C_1 and C_2 highly significant ($p < 0.01$), whereas between C_3 and C_4 treatments were significantly different ($p < 0.05$). While the treatment with the C_1 C_2 and C_3 to C_4 had no significant ($p > 0.05$). The highest total acid contained in C_4 treatment amount to 0.99% and the lowest in treatment C_1 of 0.59%. it can be seen that the higher the concentration of dextrin, the total acid will increase. This is because the total dextrin is able to bind the acid in food. The more the concentration of dextrin is given, the more acid is also retained in the product. Dextrin used to improve the appearance of the product and maintain the composition in it so often used to mix powdered beverages, confectionery and an assortment of cakes [5].

The drying timer effect of acids total on quality fruit instant passion.

From table 2, it can be seen that the long drying gives highly significant effect ($p < 0.01$) against total acid on the quality of instant passion fruit juice. In table 2, it can be seen that among of treatments T_1 , T_2 , T_3 and T_4 highly significant ($p < 0.01$), where as the treatment of T_1 to T_2 and T_3 were significantly different ($p < 0.05$). While the treatment of T_1 to T_2 and T_3 did not differ significantly ($p > 0.05$). The highest total acid contained in the treatment T_1 by 0.88% and the lowest in T_4 treatment amounted to 0.67%. The total drying time the acid in the instant passion fruit juice will decrease. The longer the drying, the more compounds volatilized, where the acid will be oxidized by the heat. Temperature and high drying time can damage the acid constituent molecules, so that the acid becomes decomposed or damaged [5].

3.6. Vitamin C Content

The effect of vitamin C concentration in dextrin on fruit passion fruit quality instant

From table 1 it can be seen that the concentration of dextrin give effect highly significant ($p < 0.01$) for vitamin C in the quality of instant passion fruit juice. In table 1, it can be seen that the treatment of C_1 , C_2 , C_3 and C_4 were significantly different ($p < 0.05$), whereas the treatment C_2 to C_3 and C_4 had no significant ($p > 0.05$). The highest vitamin C contained in C_4 treatment amount to 101.42% and the lowest in treatment amounted to 78.32% C_1 . The addition of dextrin into the product can reduce the destruction of vitamin C. The dextrin are composed of glucose units which can bind water, so that the dissolved oxygen can be reduced, as a result of oxidation processes can be prevented. Dextrin has properties that can dissolve in water, more stable to heat so as to protect the volatile compounds and compounds that are sensitive to heat or oxidation [9].

The duration of drying times effect on vitamin C on the quality fruit instant passion.

From table 2 it can be seen that the long drying gives highly significant effect ($p < 0.01$) for vitamin C in the quality of instant passion fruit juice. In table 2, it can be seen that the treatment T_4 with T_1 and T_2 and between T_3 treatment with T_1 and T_2 highly significant ($p < 0.01$), whereas between treatments T_3 and T_4 were significantly different ($p < 0.05$). The highest vitamin C contained in the treatment T_1 amounted to 135.96% and the lowest in T_4 treatment amounted to 45.21%. The relationship between long drying with vitamin C at the instant of passion fruit juice follow a linear curve as shown in Fig. 1. . The longer the drying of the vitamin C in the instant passion fruit juice will decrease. Vitamin C can be lost due to warming, which is easily oxidized vitamin C either by heat or the presence of light around him because at higher temperatures the molecules making up the vitamin C severed its ties to be broken down or damaged [9, 12].

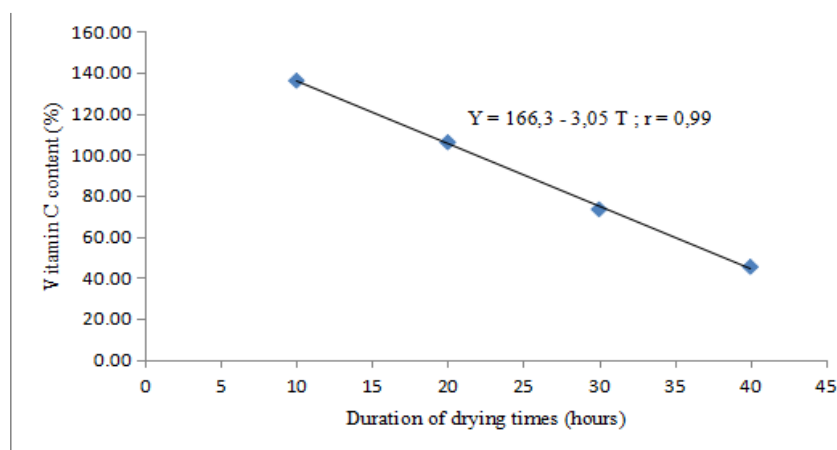


Fig. 1. The duration of drying times relationship with vitamin C on fruit instant passion.

3.7. Organoleptics Value

Dextrin concentration influence on organoleptics value at passion fruit quality instant

From table 1, it can be seen that the concentration of dextrin give effect highly significant ($p < 0.01$) against the value of the organoleptic quality of instant passion fruit juice. In table 1, it can be seen that the treatment of C_1 , C_2 , C_3 and C_4 were significantly different ($p < 0.05$). While the treatment of C_1 with C_3 and C_4 had no significant ($P > 0.05$). The highest organoleptic value contained in the C_3 treatment amounted to 3.26% and the lowest in treatment amounted to 2.83% C_4 . The relationship between the concentration of dextrin with organoleptic value on the quality of instant passion fruit juice, following a quadratic equation is presented in Fig. 2. The fig. 2 it can be seen that the higher the concentration of dextrin then organoleptic value will increase up to 30% concentration of dextrin and will further decrease. The addition of dextrin will maintain the taste and appearance of the material. Giving dextrin concentration is too high can result in the loss of distinctive flavors of passion fruit, which taste bland contained in dextrin will combination products.

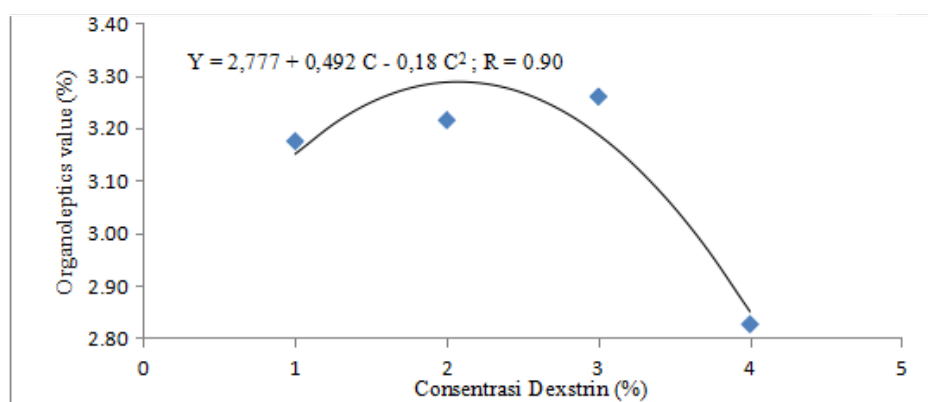


Fig. 2. The relations dextrin concentration on organoleptics value at quality powder fruit passion instant. The drying timer effect on value organoleptic at fruit quality Instant Passion.

From table 2, it can be seen that the long drying gives highly significant effect ($p < 0.01$) against the value of the organoleptic quality of instant passion fruit juice. In table 2, it can be seen that between treatments T_1 , T_2 , T_3 and T_4 were significantly different ($p < 0.05$). While the treatment of T_1 to T_3 and T_4 had no significant ($P > 0.05$). While the highest organoleptic value contained in the T_3 treatment of 3.45% and the lowest in T_4 treatment amounted to 2.83%. The relationship between the drying time organoleptic value on instant passion fruit juice, following a quadratic curve as shown in Fig. 3. The longer drying the organoleptic value on instant passion fruit juice, will increase up to 20 hours of drying time and the drying time will further decrease. This is because the drying time of 30 hours the taste, color and appearance of the food product will increase and panelists preferred. While the drying time above 30 hours, an average of less panelists liked the results of this product, this is because the drying time is too long will cause wastage of compounds volatin, be it color, aroma and flavor typical of passionfruit rosella. This is consistent with a statement declaring that the drying has several disadvantages such as the occurrence of changes in color, texture, aroma and taste. The longer the drying time, it can cause the pigments to the material experience oxidation.

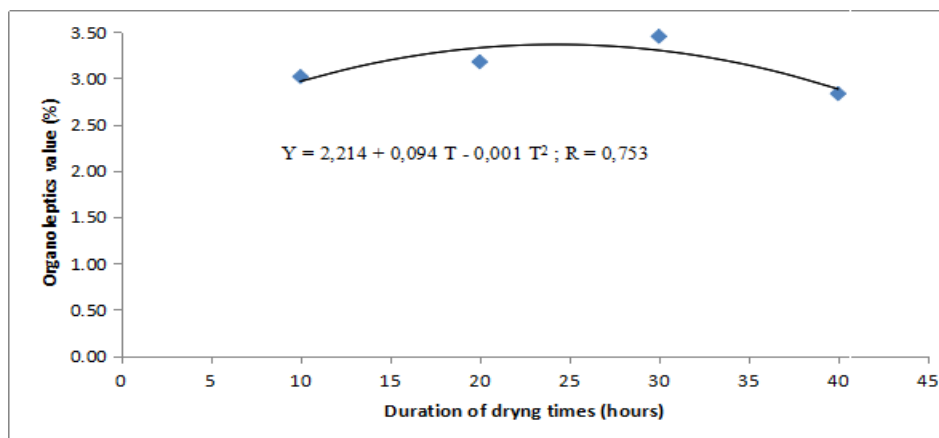


Fig. 3. The relation between duration of drying time and organoleptics value to fruit passion instan.

IV. Conclusion

The concentration of dextrin has significant effect on rendement, solubility in water, the water content, vitamin C, total acid, ash content and organoleptic value. Organoleptic value increases to 45% dextrin concentration and decreases in concentrations of 60%. The duration of drying times gave highly significant against the value of the rendement, solubility in water, the water content, vitamin C, total acid, abu content and organoleptic value. The longer drying then solubility in water and ash content increased, while the yield, moisture content, levels of vitamin C and total acid decreases. Organoleptic value increases to 30 hours drying time and decreasing the drying time of 40 hours. The combination treatment dextrin concentration and drying time no significant effect on the value of rendement, moisture content, vitamin C, ash content and organoleptic value. The quality of powdered instant passion fruit juice are best obtained at a concentration of 45% dextrin and drying time of 30 hours.

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