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Physical Analysis of Rosella Flower, Beetroot, and Red Fruit for Sausage Colorant

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ABSTRACT: This study aims to determine the physical analysis of rosella flower, beetroot, and red fruit for sausage colorant based on pH, EC, TDS, and Color L*a*b*. The material used is rosella flower, beetroot, and red fruit which has been dissolved. The method used in this research is experimental laboratory using Completely Randomized Design (CRD) with 5 treatments and 4 replications. The concentration used in red fruit and beetroot is 1% (P1), 3% (P2), 5% (P3), 7% (P4), 9% (P5) and ponceau red 0.1% (P1), 0.2% (P2), 0.3% (P3), 0.4% (P4), 0.5% (P5). Parameters observed were pH, EC, TDS, and Color. Data were analyzed using Analysis of Variance (ANOVA). If the data showed a significant difference, continued with Duncan's Multiple Range Test (DMRT). The average pH value is 6.73-7.14 on rosella flower, 5.34-5.67 on beetroot, 6.40-6.77 on red fruit; EC value is 2.23-3.13 on rosella flower, 2.40-3.03 on beetroot, 2.65-3.79 on red fruit; TDS value is 66.50-73.00 on rosella flower, 68.25-74.25 on beetroot, 61.50-65.75 on red fruit; Color L* 17.54-18.48; a* 5.26-6.01; b* 0.67-1.06 on rosella flower, L* 36.34-38.08; a* 12.55-15.51; b* 2.68-3.32 on beetroot, L* 18.35-20.17; a* 6.47-10.81; b* 1.71-2.64 on red fruit. The results showed that rosella flower, beetroot, and red fruit had no significant effect (P>0.05) on the pH, EC, TDS, and color. But the beetroot colorant is the closest to the commercial sausage color on brand x.

KEYWORDS: Beetroot, Colorant, Rosella flower, Red fruit, Physical analysis.

INTRODUCTION

Color can affect people's impression of food. The color of food can provide information about the freshness, safety, and sensory properties of food. Colorants are used in almost all types of sausages. Erythrosine and allura red are the colorants permitted food but at risk to long-term health long. Nitrites are commonly used as preservative and retains the red color Sausages are also toxic and carcinogenic. Giving color is generally aligned with the natural color of the ingredients [1]. The red colorant obtained from rosella flower extract has great potential as a food and beverage coloring agent [5]. Beetroot contain a natural color pigment, betacyanin [3]. Red fruit which has benefits as a food ingredient and a natural food coloring agent [4]. The aim of this paper is to review the colorant for culled layer chicken sausage.

MATERIALS AND METHODS

The ingredients used in this research were: rosella flower, beetroot, red fruit, distilled water, and buffer solutions 4 and 7. The tools used in this research were: beaker glass, erlenmeyer, measuring cup, stirrer, label, EC meter, TDS meter, colorimeter and pH meter.

A. Sample Preparation

Colorants are obtained from commercial stores. Furthermore, the colorant was dissolved in 10 ml of distilled water for each treatment.

B. Analysis Procedure

1) pH Test

pH or potential of hydrogen is an indication of meat quality based on the degree of acidity to express acid or base. A method to determine the pH value using the value principle electrodes calibrated with pH 4 and 7 [2].

2) EC Test

EC or Electrical Conductivity is the total content of ions in sample that have been dissolved and stirred until homogeneous, then measured using an EC meter.

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3) TDS Test

TDS concentration describes the present of inorganic salts and small amounts of organic matter in water.

4) Color Test

Instrumental color measurements by using colorimeter and was reported in the CIE color system (L*a*b*).

C. Data Analysis

Data analysis results were performed by using ANOVA (Analysis of Variance). If the data showed a real or very real test, then it was continued with the multiple distance duncan test.

RESULT AND DISCUSSIONS

Colorant	Physical Properties	P1	P2	P3	P4	P5
Rosella Flower	**pH**	6.73±0.39	7.14±0.11	7.08±0.11	7.11±0.10	7.12±0.09
	EC	2.23±0.53	2.76±0.43	2.82±0.62	3.13±0.56	2.91±0.41
	TDS	73.00±4.32	72.75±4.65	66.50±3.70	73.00±4.69	73.00±4.32
	L*	18.48±0.85	18.34±1.00	18.26±0.60	17.68±0.35	17.54±0.42
	a*	5.26±1.50	5.86±1.17	5.65±1.62	5.88±2.05	6.01±0.78
	b*	1.06±0.24	0.78±0.21	0.88±0.09	0.67±0.42	0.78±1.37
Beetroot	**pH**	5.67±0.32	5.48±0.34	5.34±0.12	5.36±0.03	5.43±0.05
	EC	2.40±0.18	2.86±0.62	2.83±0.34	3.02±0.31	3.03±0.34
	TDS	70.25±4.11	74.25±2.06	68.25±4.27	72.00±3.16	73.50±5.00
	L*	38.08±0.23	36.70±3.94	36.34±3.57	36.99±2.10	36.79±0.11
	a*	12.55±0.87	13.83±1.68	13.64±2.07	14.81±1.24	15.51±0.42
	b*	2.68±0.40	3.12±0.30	3.32±0.42	3.21±0.09	3.21±0.29
Red Fruit	**pH**	6.77±0.10	6.58±0.15	6.62±0.22	6.52±0.25	6.40±0.13
	EC	2.65±0.37	2.90±0.64	3.12±0.21	3.02±0.31	3.79±0.96
	TDS	61.50±2.38	62.00±1.15	63.75±2.99	64.75±0.96	65.75±4.57
	L*	19.02±0.96	18.35±2.03	20.17±1.43	18.66±0.47	18.73±0.63
	a*	10.81±5.60	7.25±3.57	6.47±0.74	7.24±0.76	8.02±2.79
	b*	2.64±0.66	2.24±0.47	1.88±0.40	1.77±0.43	1.71±0.39

A. pH

Table I showed that the result of pH test on rosella flower had no significant effect (P>0.05) ranging from 6.73-7.14, on beetroot had no significant effect (P>0.05) ranging from 5.34-5.67, on red fruit had no significant effect (P>0.05) ranging from 6.40-6.77. The average pH value of beetroot shows a more acidic result. Organic acids are of key importance in the determination of acidity. This means that the higher the organic acid content, the lower the pH value [7].

B. EC

Table I showed that the result of EC test on rosella flower had no significant effect (P>0.05) ranging from 2.23-3.13, on beetroot had no significant effect (P>0.05) ranging from 2.40-3.03, on red fruit had no significant effect (P>0.05) ranging from 2.65-3.79. EC value is the ability to conducts electricity from the ions contained in nutrients. EC is a parameter which shows the concentration of dissolved ions, if a lot of dissolved ions will be the higher the EC value [8].

C. TDS

Table I showed that the result of TDS test on rosella flower had no significant effect (P>0.05) ranging from 66.50-73.00, on beetroot had no significant effect (P>0.05) ranging from 68.25-74.25, on red fruit had no significant effect (P>0.05) ranging from 61.50-65.75. The TDS (total dissolved solid) value, namely the non-organic mineral content in drinkable water, is 10 – 100 ppm. Pure water itself has a TDS value of 0-10 ppm. TDS values exceeding 100 ppm are not suitable for drinking because there are too many contaminants which are bad for health [9]. This means that the TDS values for the 3 colorants are safe to use in food.

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D. Color

Table I showed that the result of color test on rosella flower had no significant effect (P>0.05) ranging from L* 17.54-18.48; a* 5.26-6.01; b* 0.67-1.06, on beetroot had no significant effect (P>0.05) ranging from L* 36.34-38.08; a* 12.55-15.51; b* 2.68-3.32, on red fruit had no significant effect (P>0.05) ranging from L* 18.35-20.17; a* 6.47-10.81; b* 1.71-2.64. L* color is a parameter for brightness with a value of 0-100. The value 0 is an indicator of black, while the color 100 is white. Color a* is a parameter of redness color which has positive and negative values with a value range of 0–80. If the value obtained is positive 0-80 then it shows red color, if the value is negative (-0) - (-80) it shows green color. The color b* is a parameter of the yellowness color. The b* color value ranges from 0-70. Positive values 0-70 indicate a yellow color, while negative values (-0) - (-70) indicate a blue color (Suyatma, 2009; [10]). Based on color testing using a colorimeter on the sausage brand x, the color value is L* 51.3; a* 20.72; b* 8.77.

CONCLUSIONS

The results showed that bettroot has the lowest average pH value and rosella flower has the highest average pH value. The average EC value on the 3 colorants has not much different. TDS values for the 3 colorants are safe to use in food. The beetroot colorant is the closest to the commercial sausage color on brand x.

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