International Journal on Advanced Science Engineering Information Technology

Vol.5 (2015) No. 5
ISSN: 2088-5334

Application of Flower Extract Wuluh Star Fruit (*Averrhoa Billimbi L.*) on Effervescent Powder

Haslina and Sri Budi Wahjuningsih

Agricultural Technology Studies Program, Semarang University, Tlogosari Semarang, Indonesia
E-mail: chana_panca@yahoo.com

***Abstract*— Excavation alternative natural ingredients that could potentially be used as a coloring agent continues, one source of natural antioxidants are used as raw material for functional foods is the flower star fruit. This study aims to determine the application star fruit flower extract (*Averrhoabilimbi L*) in effervescent powder and indigo determine solubility, antioxidant activity, total acid and water content. This study uses a randomized block design (RAK) are arranged with one factor and three replication. Further tests were used test of Duncan's Multiple Range Test (DMRT) at 5%. Starfruit flower extract formulations were applied to the effervescent powder significant effect (p <0.05) on the solubility, antioxidant activity, total acid and water content. The best treatment in effervescent powder formula II star fruit flower extract with a solubility of 0.15%, 95.95% antioxidant activity, total acid content 2.13% and moisture content 3.62%.**

***Keywords*— Anthocyanins; Flowers Start Fruit; Effervescent Powder**

I. INTRODUCTION

One source of natural antioxidants that have the potential to be used as raw material for functional foods is a flower star fruit (*Averrhoabillimbi L*). These plants belonging to the family Oxalidaceae found in nearly all corners of the archipelago. Starfruit flower contains vitamin C, iron, carotene, phenolic, flavonoids, thiamine, riboflavin and niacin as well as efficacious as thrush, high blood pressure, diabetes, rheumatism, stiff and cough. Anonymous.[1] In this study, the interest in anthocyanin extraction star fruit applied to the effervescent powder. Effervescent powder is an alternative soft drink product development interesting and gives the variation in the presentation of traditional drinks, as well as practical in storage and transport compared to regular soft drinks in liquid form. Applications anthocyanin pigments from flowers star fruit in effervescent powder has not been done and is not known the exact concentration of the addition of pigments in order to produce an attractive color. According to Hendry and Hougton [4], the addition of the anthocyanin concentration on soft drinks is 30-40 ppm, while the blackcurrant anthocyanin pigments of color that tends added at a concentration of excellence 2000-4000 ppm.

II. MATERIALS AND METHODS

A. Material

The materials used are of two kinds, namely materials for products and materials analysis. Materials for products used are flowers star fruit, sodium bicarbonate,

sodium carbonate, maltodextrin, sorbitol, citric acid, ascorbic acid and stearic acid, while the material for analysis is the Folin Dennis, DPPH, distilled water, 7.5% Na2CO3, saturated Na2CO3 and 96% ethanol.

B. Tool

The tools used for the manufacture of effervescent powder products star fruit flower extracts are scales, glass beaker, Erlenmeyer, funnel, filter cloth, blenders, spatulas, plastic, trays and vacuüm drying. While the tools for analysis are pH meter PHS-3C models Rex, Color reader, digital scales, spectrophotometry, oven, designator, centrifuges, burt and glassware.

C. Procedure Research methods

Starfruit flower extract powder is best made by adding maltodextrin. Then applied to the manufacture of effervescent powder with the treatment of various pigments and sorbitol powder ratios (Table 1).

D. Design of experiment

The experimental design used was a randomized block design (RAK) with one factor consisting of 6 treatments. Each treatment was repeated 3 times with the formulation as shown in Table 1.

TABLE I
EFFERVESCENT POWDER FORMULATION

No	Component	Formulation (gram)					
		I	II	III	IV	V	VI
1.	Pigment powder	0	1,8	1,6	1,4	1,2	1
2.	Sorbitol	0	0,2	0,4	0,6	0,2	1
3.	Na-carbonate	0	0,01	0,01	0,01	0,01	0,01
4.	Na-bicarbonate	0	1,36	1,56	1,76	1,96	2,16
5.	Sitrat Acid	0	1,05	0,85	0,65	0,45	0,25
6.	Ascorbic acid	0	0,01	0,01	0,01	0,01	0,01
7.	Maltodextrin	0	0,02	0,02	0,02	0,02	0,02
8.	Stearad Acid	0	0,06	0,06	0,06	0,06	0,06

Furthermore, the data obtained were analyzed variants and if there is a difference between treatments continued with test Duncan Multiple Range Test (DMRT) at 5%.

E. Analysis

Analysis was conducted on the solubility, antioxidant activity, total acid and water content.

III. Results and Discussion

A. Effects of Formulation Against Solubility

Based on the analysis of variance showed that the formulations significant effect ($p < 0.05$) on the solubility effervescent powder star fruit flower extracts. After further test using the Duncan Multiple Range Test (DMRT) at 5% level obtained results as shown in Table 2.

TABLE II
AVERAGE SOLUBILITY EFFERVESCENT POWDER

No	Formulation of Effervescent Powder Flower wuluh Star fruit	Solubility (%)
1.	Formula 1	$0,11^{a}$
2.	Formula 2	$0,15^{b}$
3.	Formula 3	$0,14^{b}$
4.	Formula 4	$0,11^{a}$
5.	Formula 5	$0,10^{a}$
6.	Formula 6	$0,9^{a}$

Description:
1. Data combination treatment followed by different superscript means there is significant different ($p < 0.05$), whereas the same superscript showed no significant difference ($p > 0.05$)
2. Average on the same column followed by different superscript means there is significant different ($p < 0.05$)
3. Average in the same row followed by different superscript means there is significant different ($p < 0.05$)

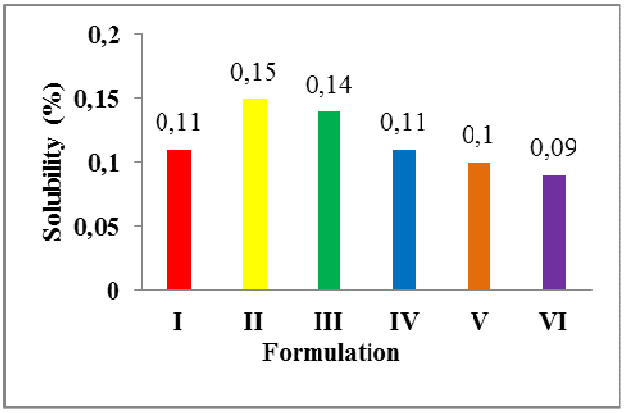


Fig. 1. Solubility Effervescent Powder

Differences in solubility caused by the shape, size, porosity, density, force, electro-static and particle friction forces as well as the experimental conditions. Yng granules contain more tartaric acid will have a greater density, so that the molecular weight will be greater. Ethanol can extract a compound with low molecular weight and degree of polarity being and can extract more optimal because it has a greater solubility properties. Ramadan [8]

B. Effect of Antioxidant Activity Against Formulation

The mean formulations on levels of antioxidant activity effervescent powder star fruit flower extract ranged between 23.51% - 96.05%. Results of analysis of variance showed that the formulation significantly ($p < 0.05$) of antioxidant activity effervescent powder star fruit flower extracts. After further test using the Duncan Multiple Range Test (DMRT) at 5% level obtained results as shown in Table 3.

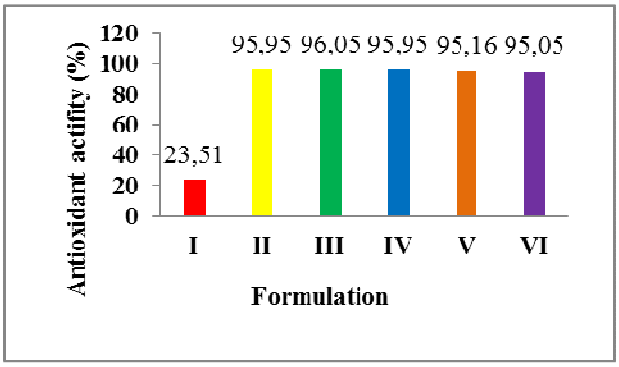
TABLE III
AVERAGE ANTIOXIDANT ACTIVITY EFFERVESCENT

No	Formulation of Effervescent Powder Flower wuluh Star fruit	Antioxidant activity (%)
1.	Formula 1	$23,51^{a}$
2.	Formula 2	$95,95^{c}$
3.	Formula 3	$96,05^{c}$
4.	Formula 4	$95,95^{c}$
5.	Formula 5	$95,16^{b}$
6.	Formula 6	$95,05^{b}$

Description:
1. Data combination treatment followed by different superscript means there is significant different ($p < 0.05$), whereas the same superscript showed no significant difference ($p > 0.05$)
2. Average on the same column followed by different superscript means there is significant different ($p < 0.05$)
3. Average in the same row followed by different superscript means there is significant different ($p < 0.05$)

Formulation III has the highest antioxidant activity which is 96.05% compared to the formulations I, II, IV, V and VI. According to Vogel [10], that the high dissolving power is associated with a polar solvent and polar compounds extracted. Sudarmadji et al [9]. states that materials and chemical compounds will be soluble in the same solvent polarity with the material to be dissolved.

Fig. 2. Antioxidant activity *Effervercent* powder



C. *Effect Against Total Acid Formulations*

Table 4 shows that the total acid ranged from 0.43 to 2.13%. Based on the analysis of variance showed that the formulations significant effect (p <0.05) against total acid effervescent powder star fruit flower extracts. After further test using the Duncan Multiple Range Test (DMRT) at 5% level obtained results as shown in Table 4.

TABLE IV
AVERAGE TOTAL ACID EFFERVESCENT

No	Formulation of Effervescent Powder Flower wuluh Star fruit	Total Acid (%)
1.	Formula 1	0,43[a]
2.	Formula 2	2,13[e]
3.	Formula 3	2,07[d]
4.	Formula 4	2,04[cd]
5.	Formula 5	2,02[bc]
6.	Formula 6	2,00[b]

Description:

1. Data combination treatment followed by different superscrip means there is significant different (p <0.05), whereas the same superscript showed no significan difference (p>0.05)
2. Average on the same column followed by different superscript means there is significant different (p <0.05)
3. Average in the same row followed by different superscript means there is significant different (p <0.05)

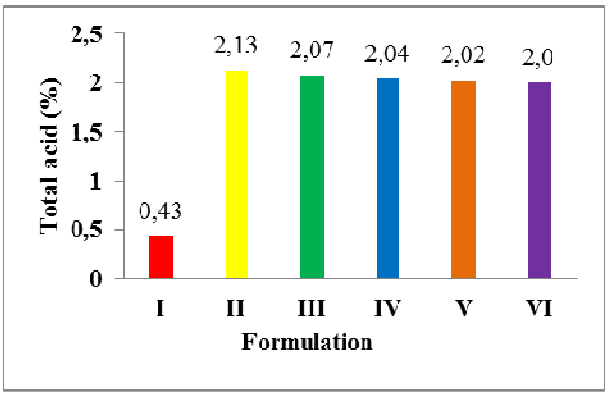


Fig. 3. Total Acid *Effervercent* powder

Differences in total acid thought to be caused by a different formulation. Sorbitol total acid content in the materials. Merynda.[6] Increased concentration in effervescent powder will increase the content of citric acid as an organic acid dominant thereby increasing total acid effervescent powder. Hulme.[5] The higher the concentration of sorbitol, the lower the total acid. With a high acid number and by a process of heating and water absorption by sodium bicarbonate caused by acid hydrolysis of the sucrose and fructose and glucose. The reaction causes a decrease in total acid in the ingredients because most of the acid used to hydrolyse sucrose. Gaman and Sherrington.[3]

D. *Effects of Formulation Water Content*

Based on the analysis of variance showed that the formulations significant effect on water content (p <0.05) effervescent powder. After further test using the Duncan Multiple Range Test (DMRT) at 5% level obtained results as shown in Table 6.

Results of the analysis of fluctuating water levels, the water content in the highest effervescent powder formula II and the lowest in the formula I. Fluctuations allegedly occurred during formulation II less effort humidity control room, it makes the granules quickly absorb moisture from the environment, so that the water content increases. The more the use of sodium bicarbonate will increase the water content of the granules. Burhan [2].

TABLE V
AVERAGE WATER CONTENT EFFERVESCENT

No	Formulation of Effervescent Powder Flower wuluh Star fruit	Water Content (%)
1.	Formula 1	3,19[a]
2.	Formula 2	3,62[e]
3.	Formula 3	3,56[c]
4.	Formula 4	3,49[d]
5.	Formula 5	3,41[b]
6.	Formula 6	3,34[f]

Description:

1. Data combination treatment followed by different superscrip means there is significant different (p <0.05), whereas the same superscript showed no significant difference (p>0.05).
2. Average on the same column followed by differen superscript means there is significant different (p <0.05)
3. Average in the same row followed by different superscript means there is significant different (p <0.05)

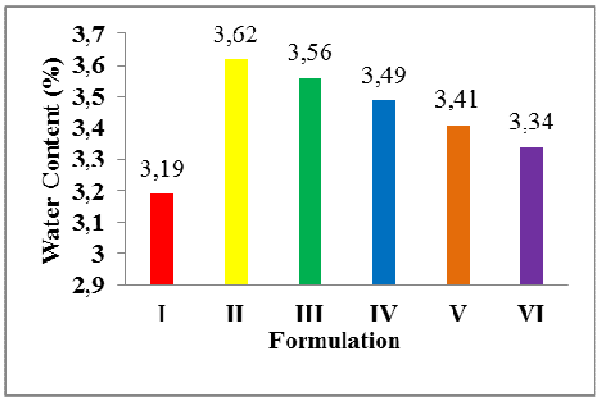


Fig. 4 Water content *Effervescent* powder

IV. CONCLUSIONS

Effervescent powder formulation starfruit flower extract significant effect ($p < 0.05$) on the solubility, antioxidant activity, total acid content andmoisture content. The best treatment in the formula II is effervescent powder flower extract starfruit with a solubility of 0.15%, 95.95% antioxidant activity, total acid content 2.13% and moisture content 3.62%.

ACKNOWLEDGMENT

The author would like to thanks DIKTI, which has funded research grant competition in 2013/2014-2014/2015.

REFERENCES

[1] Anymous. 2004. BelimbingWuluh. Iptek Net. http://iptek.net.idcakraobat/tanamanobat php?id:69 (acces 14 Pebruari 2004). [1]

[2] Burhan, L., Yoemlan, P.V.Y, dan Suprapti, H.S. 2012. Formulasi Sediaan GranulEffervescentSari Buah Sirsak (Annonamuricata L). UNSRAT, STIKES Muhammadiyah. Manado.

[3] Gaman, P. M., K. B. Sherrington. 1994. Pengantar Ilmu Pangan, Nutrisi, dan Mikrobiologi. (Gardjito, Naruki, Murdiati, Sardjono,penerjemah) Yogyakarta Gadjah Mada University Press.

[4] Hendry. 1996. Natural Food Colours. Di dalam Natural Food Colorants. Hendry, G. A. F. dan J. D. Houghton (ed.). 1996. 2 nd ed. Blackie Academic& Profesional London.

[5] Hulme, A. C., 1971. The Biochemistry of Fruits and Their Products. Academic Press Inc. New York. 1971.

[6] Merynda., 2010 Dasar Teknologi Pangan Bogor: FakultasTeknologid anMekanisasiPertanian, IPB.

[7] Rein, M, 2005. Copigmentation Reactions and color stability of Berry Anthocyanin. Academic Dissertation, Helsinki:University of Heslinci.

[8] Ramadani.2010. Karakteristik Permen Jelly TimunSuri(Cucumismel o L.) dengan Penambahan Sorbitol danEkstrak Kunyit (Curcuma domestika Val.). UNSRI. Indralaya.

[9] Sudarmadji, S., B. Haryono, Suhardi.2003. ProsedurAnalisauntuk BahanMakanandanPertanian. Liberty, Yogyakarta. 98 p.

[10] Vogel, 1987.Text book of quantitative in organic analisis.Edisi4.London : Longman group Limited., 1987.