EFFECT OF CARBIDE AND CaCl2 CONCENTRATION ON VITAMIN C CONTENTS OF BANANA *KEPOK*

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ABSTRAK

Pisang kepok banyak ditemukan di pasaran. Buah ini mengandung mineral dan vitamin C yang sangat diperlukan oleh tubuh. Vitamin C adalah zat organis yang merupakan koenzim atau askorbat kofaktor pada berbagai biokimia reaksi tubuh dan tidak dapat dibentuk oleh tubuh. Vitamin C larut dalam air dan mudah rusak bila terkena panas. Saat ini banyak pedagang pisang yang menggunakan karbit dan CaCl2 untuk membantu proses pematangan buah pisang. Penelitian ini bersifat eksperimental menggunakan teknik Analisa Kuantitatif, dilakukan pada bulan Juni - Juli 2010 di Laboratorium Kimia Makanan dan Minuman Analis Kesehatan Surabaya. Hasil penelitian yaitu rata-rata kadar vitamin C tanpa perlakuan sebesar 0,0292%, dikarbit 1 gram sebesar 0,0222%, 2 gram sebesar 0,0373%, 3 gram sebesar 0,0203% dan direndam CaCl2 1% sebesar 0,0160%, 2% sebesar 0,0112%, 3% sebesar 0,0168%. Dilakukan uji statistik kruskal wallis test ada pengaruh signifikan konsentrasi (gram karbit dan persen CaCl2) terhadap kadar vitamin C pada pisang kepok. Disarankan pada masyarakat untuk menghindari proses pematangan menggunakan perendaman CaCl2 atau dengan carbiding konsentrat 2 gram saja atau lebih baik menunggu matang secara alami. ***(FMI 2013;49:97-100)***

Kata kunci: *pisang kepok, vitamin C, karbit, CaCl2*

ABSTRACT

Banana kepok is much available at any market in Indonesia. This fruit is rich of minerals and Vitamins C that very important for our body. Vitamin C is an organic coenzyme or ascorbat cofactor in various biochemichal response of our body which it could not be produced by the body itself. Vitamin C is water soluble and damagable to heat affection. Currently many traders are using carbide or CaCl2 solvent to boost ripening of banana fruit. This research is experimentally and by using quantitative analysis technique to find out the affect. This research took place on June-July 2010 at Food and Beverage Chemical Laboratory of Health Analyst Polytechnique Surabaya. The results was Vitamin C prorate contents before treatment 0,0292%, 1 gram carbide treatment 0,0222%, 2 gram 0,0373%, and 3 gram 0,0203%, while soaking with CaCl2 1% was 0,0160%, 2% was 0,0112%, 3% was 0,0168%. Kruskal wallis statistic test was carried out, The conclusion is concentration (gram carbide and CaCl2) significantly affected to the percentage of vitamin C contents of ripening banana kepok. Consequently it is recommended to avoid using CaCl2 for ripening banana, or using carbide of 2 grams only, or better leave it as it is ripening it self. ***(FMI 2013;49:97-100)***

Keywords*: Pisang kepok, vitamin C, carbide, CaCl2 solvent*

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INTRODUCTION

Bananas grow in clusters and are the result of people's plantations are scattered in almost all regions in Indonesia. Famous banana commodity price cheap and easily available anywhere and anytime because bananas do not know the harvest season. Plants of the Musaceae family live in the tropics with different types. Call it green banana, banana lemongrass, plantain, banana horns, sunripe bananas, and bananas *kepok*. Bananas have a lot of benefits ranging from stem, flower, fruit to leaves (Alamatsier 2003, Astawan 2009).

Bananas are rich in minerals, vitamins, carbohydrates, fiber, protein, fat, etc., so that if people only eating bananas alone, then it is minimally adequate nutrition. Banana is a fruit that is energy dense and rich benefits, because in general the nutrients contained in each ripe banana fruit are as follows: calories 99 calories, 1.2 grams protein, 0.2 grams of fat, carbohydrates 25.8 milligrams (mg), 0.7 grams fiber, 8 mg calcium, 28 mg phosphorus, 0.5 mg iron, 44 RE vitamin A, .08 mg vitamin B, vitamin C 3 mg and 72 grams of water (Aurel 2009). Besides bananas contain three natural sugars namely, sucrose, fructose, and glucose. These substances provide immediate energy boost that quite a lot and have a low glycemic index which is good for

brain activity. Right now many farmers grow bananas, because bananas can generate a considerable profit (Cahyono 2009). Many of the farmers who harvest the bananas are not ripe. Most of them brood banana by using carbide. This is done because the carbiding, bananas will be faster ripening and ready for sale. Calcium carbide or carbide is a chemical compound with chemical formula CaC2 carbide is used in carbide welding process and can also speed up the ripening of fruit. Equation is Calcium Carbide with water: CaC2 + 2 H2O → C2H2 + Ca (OH)2 (Pujimulyani 2009).

Therefore 1 gram CaC2 produces 349 ml of acetylene. Carbide is a chemical that has long been used by farmers in helping the process of maturation of the fruit. Basically fruits contain ethylene compounds useful for the process of fruit ripening naturally. Carbide is mixed with water to produce a gas which is a gas acetilene. When a mixture of calcium carbide with water is sprayed onto the fruit is still unripe, the fruit will ripen earlier than it should. This happens because of the mixture of gas acetilene carbide with water that stimulates the natural ethylene gas to speed up the ripening process. However, in addition to hyper maturity, acetylene gas produced from calcium carbide is also beneficial to remove the green color. For example, acetylene gas in the process ripening citrus fruits will stimulate the formation of ethylene gas in the cell. Ethylene gas remodel the orange peel chlorophyll and carotenoid pigment synthesis. The reshuffle activity occurs only in subepidermal layer of the fruit skin. The result is that the original green rind turned orange without changing the taste of the fruit. This was evidenced by Dr. Mohamad Soedibyo and Ir. Wisnu Broto, MS, researcher at the Center for Agricultural Postharvest Research and Development in Bogor. In his research Soedibyo 1992, show degreening using acetylene gas does not change the nutritional value of oranges. While research results by Meddlicot et al. (1990) on acetylene gas does not affect the total sugar content, total acidity, and vitamin C. That is, the provision of carbide only changes the appearance of orange peel from orange to green without changing the taste and nutritional value.

In addition to the carbide, no studies using the Calcium Chloride (CaCl2) can also speed up the process of fruit ripening. The researchers conducted the study with plantain fruit fur soaked in CaCl2 1% and 2% CaCl2 with a soak time of 30 minutes, 60 minutes, and 120 minutes. The results stated that bananas are soaked with 1.5% CaCl2 for 120 minutes, the levels of vitamin C 5.925 mg/100 g, while the marinated with CaCl2 1% levels of vitamin C not much different from the controls. This study was conducted to determine and prove whether there is influence carbiding concentration of 1 gram, 2 grams, 3 grams and soaking CaCl2 with a concentration of 1%, 2%, 3% of the vitamin C content in bananas *kepok* stored for 2 days, so this study can be useful in the information society, especially as eating bananas *kepok* good with appropriate treatment without reducing the amount of vitamin C as an antioxidant for the body.

MATERIALS AND METHODS

The design in this study was experimental methods with quantitative analysis techniques. With material *kepok* bananas sold in the area Dharmahusada Surabaya method is to select the data collection and retrieval of primary data is data obtained directly from the results of the assay of vitamin C in raw *kepok* banana in carbide as much as 1 gram, 2 grams, 3 grams and the soak CaCl2 1%, 2%, 3% to 6 each sample was done in the Laboratory of Chemical Health Food Beverage Analyst Surabaya. 1 banana samples obtained from merchants taken 6 different *tundun*. Of each *tundun*of banana, one*sisir*of banana *kepok*was taken 1 *kepok*. Each *sisir* retrieved 7 bananas, which are used for multiple treatments, namely 1 for the control (no treatment), 3 pieces for carbiding and 3 pieces for the marinated with CaCl2. With the sample criteria (banana) was fresh green and still raw.

Six banana *kepok* prepared for each treatment (1 gram, 2 grams, 3 grams) which has been washed first. Carbide weighed 1 gram, 2 grams, 3 grams. Six banana *kepok* in each treatment carbide added 1 gram, 2 grams and 3 grams and wrapped in newspaper. Then each stored for 2 days. For bananas soaked *kepok* CaCl2, prepared six bananas *kepok* for each treatment (1%, 2%, 3%) who had been washed first. CaCl2 as much as 1 gram, 2 grams, 3 grams dissolved into a measuring cup and add 1000 ml. Six banana *kepok* in each treatment marinated with CaCl2 1%, 2% and 3% and stored for 2 days. The research method is the principle of checks Iodimetri Vitamin C is reacted with iodine. The indicator used is Amylum. Titration end point is marked with the blue color of iodine. Analysis of the data used ANOVA test with SPSS 11.5 program on the computer (Santoso 2008).

RESULTS

Based on the analysis of the levels of vitamin C in bananas without carbiding and soaking CaCl2, carbiding 1 gram, 2 grams carbiding, carbiding 3 grams, 1% CaCl2 immersing, soaking CaCl 2%, 1% CaCl2 soaking research data obtained (Table 1).

Table 1. Levels of vitamin C in bananas without treatment, carbiding 1 gram, 2 grams, 3 grams, and soaking CaCl2 1%, 2%, and 3% were stored for 2 days.

	No	Carbiding (%)			Immersing $CaCl_{2\ (\%)}$		
Code	Treatment	1 gram	2 gram	3 gram	1 %	2%	3 %
1	0.032	0.021	0.027	0.030	0.007	0.010	0.014
2	0.031	0.025	0.030	0.032	0.014	0.014	0.010
3	0.027	0.018	0.048	0.025	0.028	0.012	0.019
4	0.028	0.021	0.039	0.018	0.025	0.010	0.019
5	0.030	0.023	0.043	0.007	0.012	0.009	0.018
6	0.027	0.025	0.037	0.010	0.010	0.012	0.021
Mean	0.029	0,022	0,037	0,020	0,016	0,011	0,016

After examination showed levels of vitamin C in bananas *kepok* that without treatment, with carbiding 1 gram, 2 grams, 3 grams of CaCl2 and soak in 1%, 2%, and 3%, then the next test for normality of the data. If the data are normally distributed then followed with ANOVA test for the presence or absence of the effect obtained carbiding and soaking CaCl2 concentration on levels of vitamin C in bananas *kepok* stored for 2 days. Based on the test results obtained further post hoc test value (p) value is the value <p (0.05) is between banana *kepok* without the addition, with the addition of carbide 1 gram, 2 grams, 3 grams ; and immersion CaCl2 1%, 2%, and 3%.

DISCUSSION

Based on the results of the determination of the effect of vitamin C concentration and immersion carbiding CaCl2 on bananas *kepok* stored for 2 days data showed that the treatment carbiding have a higher vitamin C content is 0.026% compared with 0.014% CaCl2 soaking treatment. Where the treatment carbiding that have higher levels of vitamin C in carbiding as much as 2 grams. From the results of the study did not have elevated levels of vitamin C which is very significant, where the vitamin C content in ripe banana fruit according to the literature of 0.025%. and this is in accordance with the statement of Soedibyo Moh et al stating that the fruit is treated carbidingthe acitilene on gas will not affect the levels of vitamin C in fruit and can only change the external appearance of the fruit and its nutritional value.

Based on the properties of vitamin C that is easily evaporate when exposed to heat and there are some bananas that content changes due carbiding. This is because during the process carbiding temperature rise (heat), thus affecting the properties of vitamin C and vitamin C that is easily damaged or evaporate due to the heat and the presence of carbide compounds that enter into the content of bananas and change the nutritional value and appearance of bananas but not alter the levels of vitamin C in bananas.

While the immersion treatment CaCl2 levels of vitamin C obtained on banana *kepok* average of 0.014%. The results of this research have decreased when compared to the levels of vitamin C in the literature of 0.059% for the levels of vitamin C in bananas. This is because of the element of CaCl2 were absorbed into the fruit flesh, which indirectly affects the nutritional content of bananas are soaked in a solution of CaCl2 one vitamin C. In addition, because vitamin C is easily soluble in water and in the presence of CaCl2 Ca elements that go into in the flesh, so that these elements affect levels of vitamin C in bananas *kepok*. Therefore, according to the results of research on the treatment carbiding an increase that is not too high so there is not too significant influence, whereas the immersion treatment CaCl2 contained significant effect of vitamin C on banana *kepok*. From the research and statistical tests using Kruskal-Wallis test showed that that the value is significantly smaller than p0.000 < 0.05. It can be concluded that no effect concentration (grams of calcium carbide and percent CaCl2) on the levels of vitamin C in bananas *kepok*.

CONCLUSION

From the results of this study concluded that the treatment increased carbiding that is not too significant so as not to affect the levels of vitamin C in bananas *kepok*, but it looks really affect the external appearance and nutritional value of the banana *kepok* which decreased from pre- treated banana *kepok*carbiding. While soaking in CaCl2 treatment decreased by +60% when compared with the literature bananas levels of vitamin C, so a significant effect on the levels of vitamin C in bananas *kepok*. It can provide information to the public and researchers themselves that the fruit ripening process by soaking CaCl2 not recommended but if the way carbiding recommended that at a

concentration of 2 grams or better to wait until the ripe bananas naturally. In order to increase public awareness of the importance of nutritional benefits found in bananas, one of which is vitamin C, it is expected to further research to develop existing research.

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