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INTERNATIONAL CONFERENCE ON FOOD SCIENCE AND TECHNOLOGY

THE CHALLENGE OF UNIVERSAL FOOD QUALITY AND SAFETY REGIME

THEATRE ROOM,
3RD FLOOR OF
THOMAS AQUINAS BUILDING,
SOEGIJAPRANATA
CATHOLIC UNIVERSITY,
SEMARANG, INDONESIA

ON:
THURSDAY AND FRIDAY,
31 JULY AND 1 AUGUST 2008

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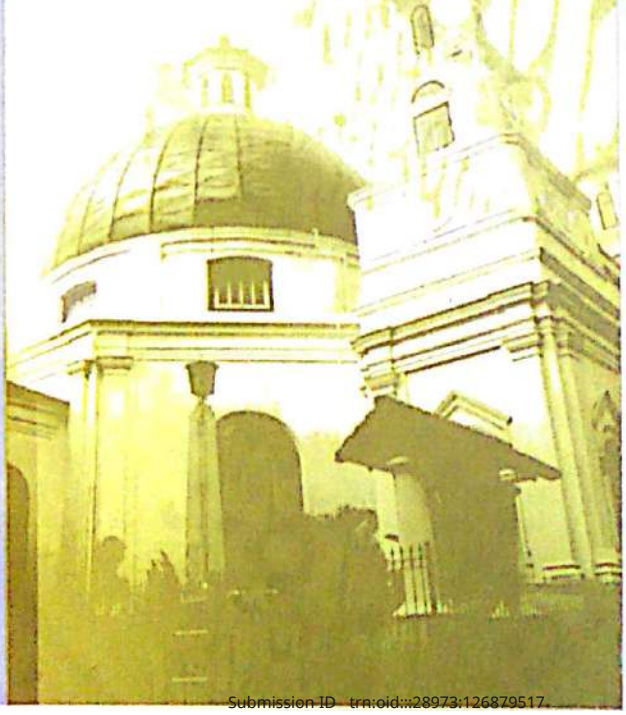

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PREFACE

Food quality and safety is nowadays not just the main concern in every stage of food chain, but is likely a new stage in food culture. Food scientist, food technologists, food industry, as well as business communities and the governmental bodies are challenged not just to care of, but to guard the new era of man-kind culture on food. For this the faculty of Agricultural Technology, Soegijapranata Catholic University invites food communities all over the world to share their ideas, research findings as well as opinions in the International Conference on Food Science and Technology, to welcome "The Challenge of Universal Food Quality and Safety Regime".

The conference successfully gathering about 100 papers, presented by more than 7 countries in two days. This proceeding brings together these papers, organized in two presentation schemes :

A. Oral, covering of 6 topics :

1. Food Supply Chain Deversity
2. Food Processing and Engineering
3. Food Microbiology and Biotechnology
4. Food Marketing and Quality Management
5. Nutritional and Functional Food
6. Food Safety and Quality

B. Poster, followed by 34 papers

In order to response the newest trend on food quality and safety regime, the conference also organized 6 plenary presentation focusing on "The Challenge of Universal Food Quality and Safety Regime". The organizing committee is grateful to all honorable speakers, participants and sponsors, for joining this gathering and for their valuable contribution on the conference.

Semarang, August 2008

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International Conference on Food Science and Technology
"The Challenge of Universal Food Quality and Safety Regime"
Department of Food Technology, Soegijapranata Catholic University, July 31 and August 1, 2008

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EVALUATION OF PHYSICOCHEMICAL PROPERTIES AND MICROBIAL LOAD OF PINK GUAVA JUICE (*Psidium guajava L.*) DURING PASTEURIZATION PROCESS

Veronica Ima P [1)], Amelia Jovita [2)], Probo Y. Nugrahedi [2)] and V. Kristina Ananingsih [2)]

[1)] Food Department of Theresiana Vocational of School Chemical Industry
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ABSTRACT

Pink Guava (*Psidium guajava L.*) is one of the tropical fruits which most of its part can be consumed or processed, for example as a fruit juice. This juice is added with water, sugar, citric acid, and stabilizer such as CMC (*Carboxy Methyl Cellulose*). A part of the method of fruit juice processing is pasteurization, which has a main purpose to decrease microorganisms load but can change the physicochemical properties of the product. This research investigated the effect of pasteurization temperatures both at 65°C and 77°C on physicochemical characteristics and microbial load of pink guava juice. Total Plate Count (TPC) of bacteria, mold, yeast, and physicochemical properties, the viscosity, color intensity, TSS (*Total Soluble Solid*), antioxidant activity, vitamin C, and pH were evaluated. Both pasteurization at 65°C and 77°C were sufficient to reduce microorganisms level below the permitted limit of SNI after 18 minutes of heating. Result also showed that based on lethal rate and F value calculation, reducing the amount of microorganisms as many as 5 D's like Salmonella, Escherichia coli, Listeria monocytogenes, and Allicyclobacillus was possible. Furthermore, the viscosity, TSS (*Total Soluble Solid*), and color intensity were increase while antioxidant activity and vitamin C were decrease. Level of pH was not affected during pasteurization.

Keywords: *Pasteurization, Guava Fruit, Juice, Physicochemical Characteristics, Microorganisms*

INTRODUCTION

Guava (*Psidium Guajava L.*) is one of the popular tropical fruit, which is commonly consumed either as a fresh fruit or processed ones, such as juice, concentrate, and jam. Foster & Vasavada (2003) reported, that there are a lot of juices types in the market, that are juice (100% fresh fruit juice), combined juice (combination from some juice), juice beverage (non 100% fruit juice) and beverage with fruit flavor. One of the juice making steps is pasteurization. Pasteurization is able to maintain microbiological quality of food materials, with enzyme become inactive and destructs microorganism (Fellows, 1998).

The objectives of this study are to evaluated physicochemical characteristics of pink guava juice pasteurization process and to evaluate heat sufficiency of pasteurization at two different temperatures (65°C and 77°C) regarding microbial load. This also to evaluate heat sufficiency of pasteurization to lethal microorganism characteristics of pink guava juice with the calculation of lethal rate and (F value).

MATERIAL AND METHODS

Pink guava fruits and sugar were obtained from local market. Matured ripe guava fruit selected. Other materials like citric acid, and CMC (*carboxy methyl cellulose)* were obtained from local chemical store. Equipments which were used in this research, for example are Memmert WB/ob 14 waterbath, autoclave, heater *Laminar Air Flow* (LAF), and UV Mini 1240 Shimadzu spectophotometry.

Pink Guava Juice Formulation

Samples were prepared according to Zainal et al. (2000). Firstly fruits were washed using water. The fruit were then blanched in a steam blancher until the temperature reached 100°C and then were held at this temperature for 3 minutes. The blanched fruit were crushed with a blender followed by a filtration. Juice was added with 0.1% of CMC (ml/juice), 10.4% sugar, 0.15% citric acid.

Pasteurization was conducted at two temperatures 65°C and 77°C and two phases that were pre –pasteurization and pasteurization. Time of pre-pasteurization at 77°C could be reached for 31.72 minute and each sample as taken every 6.344 minute. While at temperature of pre-pasteurization 65°C was 33.67 minutes and each sample was taken every 6.734 minute. Pasteurization process were done 30 minutes.

Evaluation of Viscosity, Color Intensity, Total Soluble Solid (TSS), and pH

Viscosity was determined using viscotester with 1st rotor (used for material of 3-150 dPas). Color intensity was determined using spectophotometry with an absorbance at 400 nm. Total soluble solid (TSS) was evaluated using hand Refractometer Atago N-1. pH was measuring using Denver Instrument pH-meter.

Evaluation of Antioxidant Activity and Vitamin C

Antioxidant activity was measured using method that involved the use of the free radical 2.2-diphenyl-1-picrylhydrazyl (DPPH), where antioxidants were allowed to react with stable radical in methanol solution. Guava juice (0.5 gr) were extracted with methanol (5 ml) for 2 hours. The extract (0,1 ml) was reacted with 3.9 ml of *1,1Diphenyl-2-Pircylhydrazyl* (DPPH) solution (2.4 mg of DPPH in 100 ml of methanol). Measuring absorbance was done at 515 nm using UV Mini 1240 Shimadzu spectophotometry.

Antioxidant Activity was calculated as % discoloration by formula bellow:

$(1-[A_{t30\,\text{minutes}} / A_{t0\,\text{minutes}}])x100$ (Beta *et al.*, 2005).

Meanwhile, vitamin C was determined by a iodimetry method with a formula below:

mg ascorbic acid (in 100 ml sample) = titration volume* 0,88 *10 (dilution factor) (Sudarmadji *et al.*, 1989).

Microbiological Analysis

Microbiological analysis include of total plate count of bacteria, mold, and yeast during pre-pasteurization until pasteurization. Evaluation process represented determination of F value when certain process or process time is required for the F of certain value. F value can be calculated by equation:

$$F = \Delta t \sum_{i}^{n} L \quad \text{at interval time of 1 minute } \Delta t = 1$$

Δ t = interval time (minute)
L = lethal rate (minute)
(Holdsworth, 1997)

Data Analysis

All data were subjected to analysis of variance (one way ANOVA) procedure using SPSS (*Statistical Package for Social Science for* windows) 11.5 version. Means were compared at the 95% significant difference (p>0,05).

RESULT AND DISCUSSION

The effect of pasteurization temperature of 65°C and 77°C to the physicochemical characteristics and microbial load of fruit juice are shown in tables and figures below.

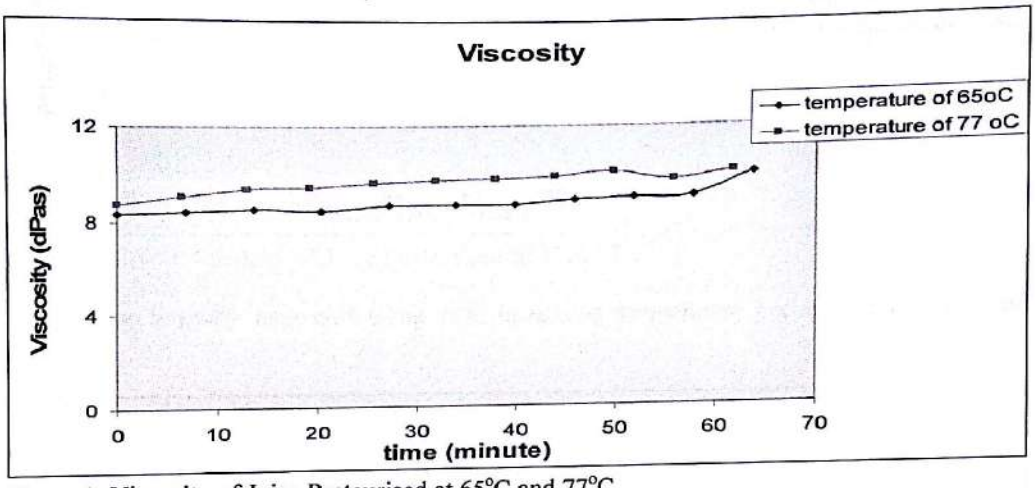

Figure 1. Viscosity of Juice Pasteurised at 65°C and 77°C

The viscosity of pink guava juice increased with increasing temperature both at 65°C and 77°C of pasteurization. The possibly due to evaporation process. evaporation is transfer process some of water of food materials to liquid because bubbling point (Fellow,2000).

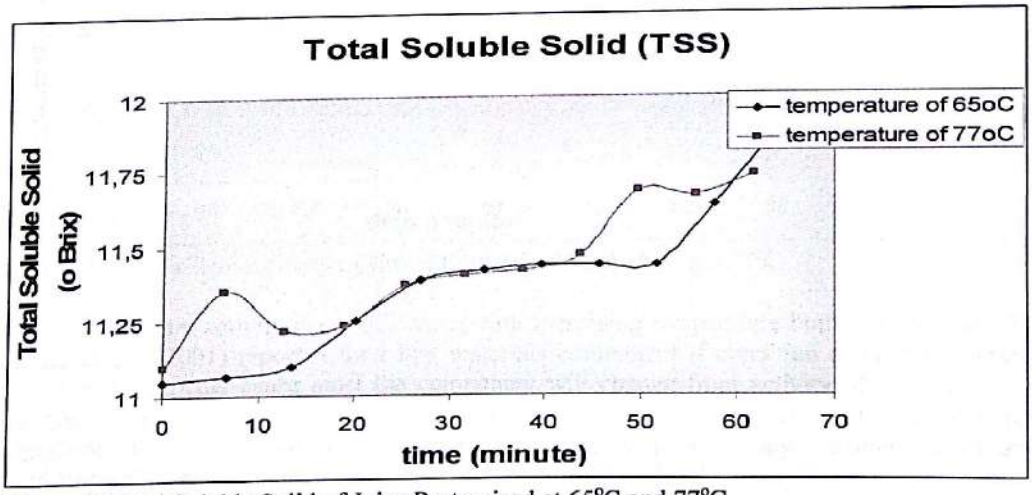

Figure 2. Total Soluble Solid of Juice Pasteurised at 65°C and 77°C

TSS (Total Soluble Solid) increased during pasteurization because of dissolved concentrate. According to Les (1998), the components of concentrate which are not the dissolved

increase of will be dissolved at the time of heating process so that will increase content of dissolved fluid.

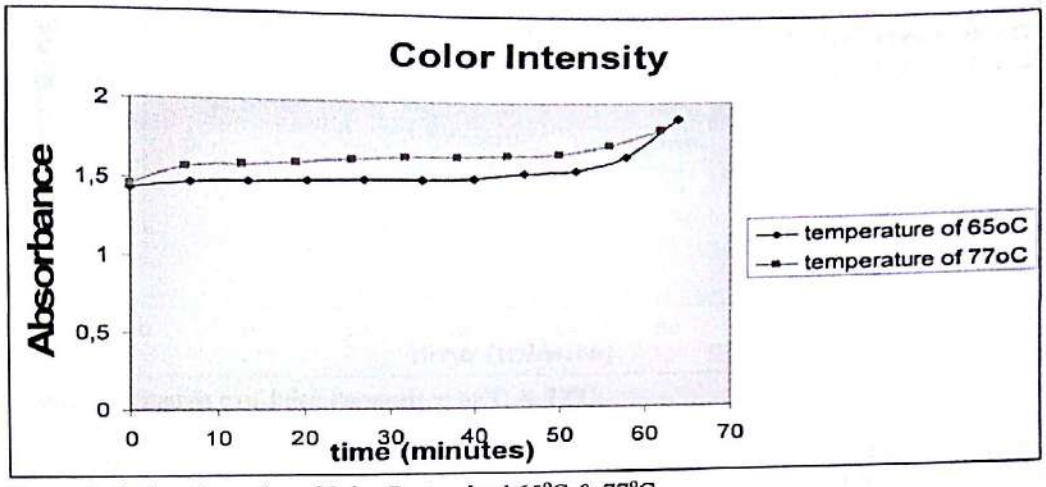

Figure 3. Colour Intensity of Juice Pasteurised 65°C & 77°C

Color intensity increased along with increasing temperature because of non enzymatic browning.

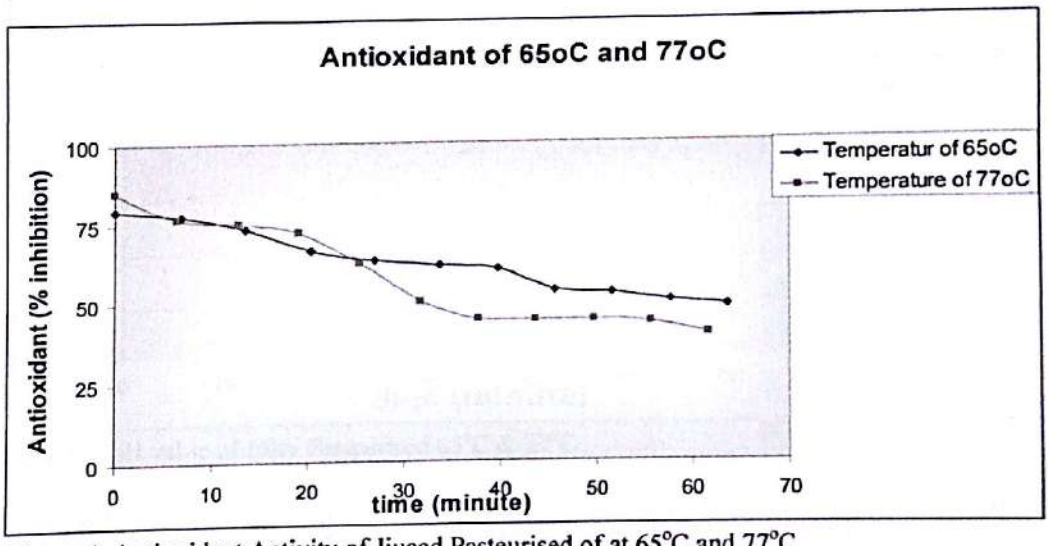

Figure 4. Antioxidant Activity of Jiuced Pasteurised of at 65°C and 77°C

Antioxidant activity decreased along with increasing temperature both at 65°C and 77°C. Pokorny et.al, (2001) reported food that materials component if condition at high temperature during heating process cause most the component will change from activity of antioxidant and often times lessen ability. Antioxidant activity depends on many factors such as the lipid composition, antioxidant concentration, temperature, oxygen pressure, and the presence of other antioxidant and many common food component, e.g protein and water.

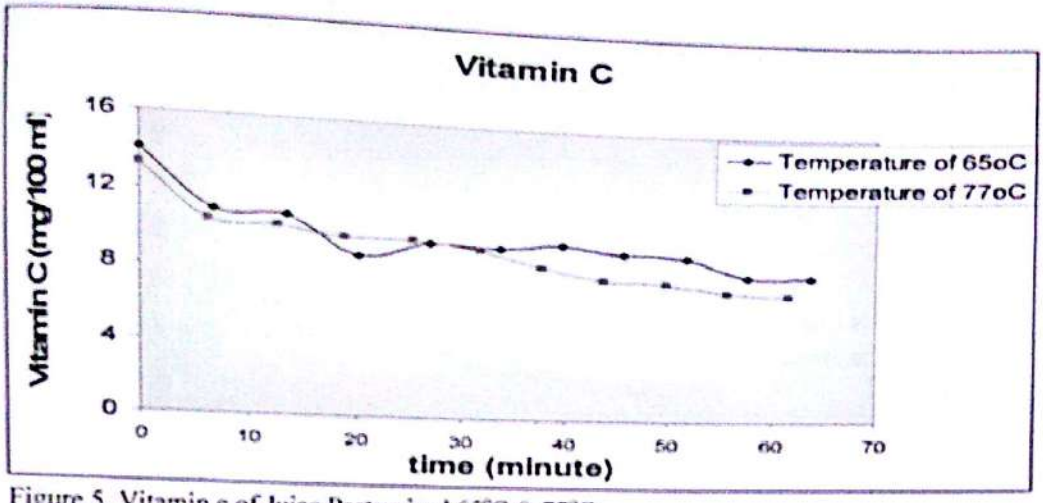

Figure 5. Vitamin c of Juice Pasteurised 65°C & 77°C

Degradation of ascorbic acid or vitamin C was observed at pasteurization temperature of both 65°C and 77°C.This due to that ascorbic acid is more sensitive to heating process. Many factors also influence the degradation, such are temperature, concentration, pH, oxygen, enzyme, metal, and acid condition (Sudarmadji, 1989).

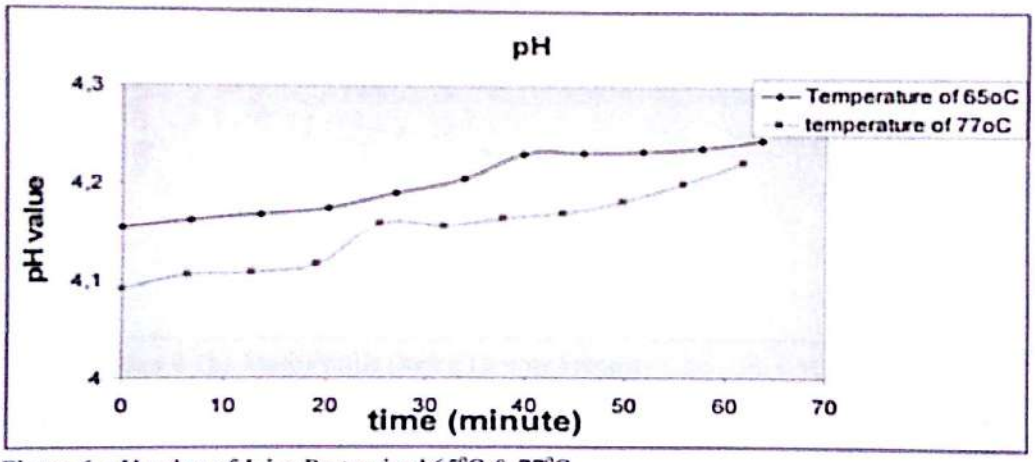

Figure 6. pH value of Juice Pasteurised 65°C & 77°C

pH values were not significantly different at pasteurization of 65°C and 77°C. Chang, et al., (1994) also reported that pH of plum juice did not change significantly during of heating process.

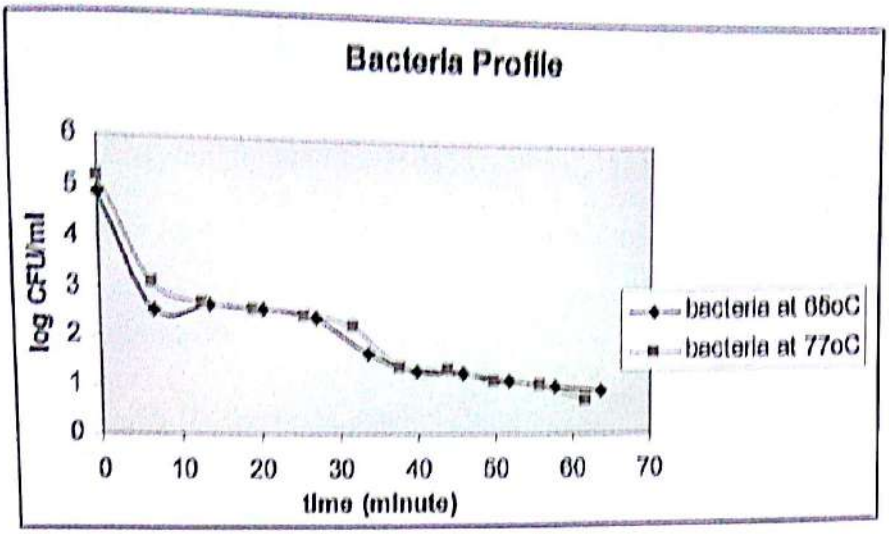

Figure 7. (a). Bacteria Profile During Heating Process

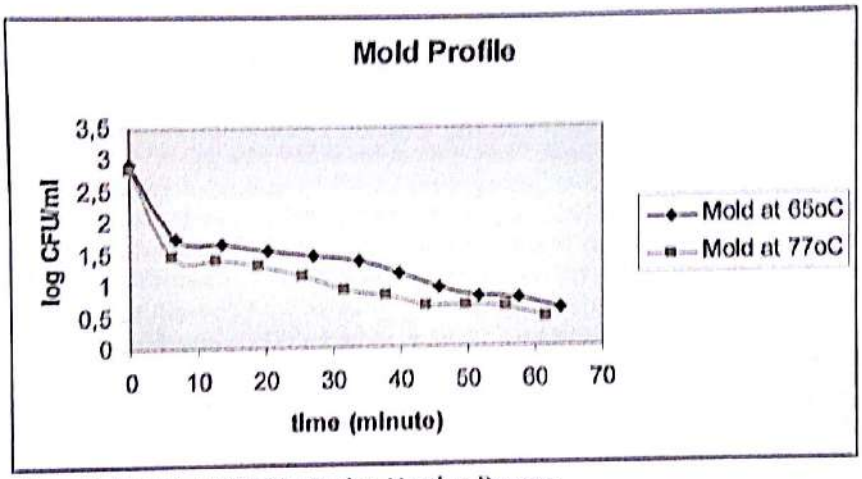

Figure 8. (b). Mold Profile During Heating Process

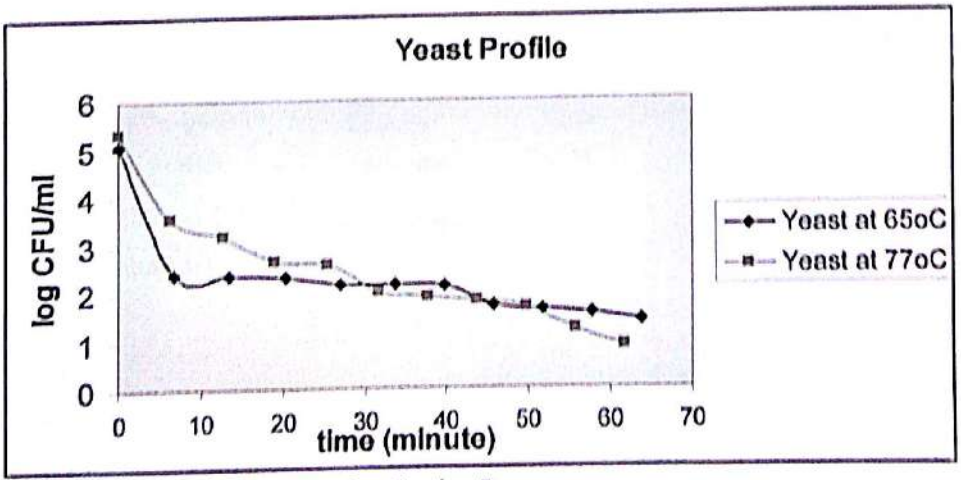

Figure 9. (c). Yeast Profile During Heating Process

Both pasteurization showed that the amount of bacteria, mold and yeast decreased significantly at temperature of 65°C and 77°C. Pasteurization at both temperature of 65°C and 77°C had fulfilled the requirement of The Indonesian National Standard for a Fruit Juice (SNI 01-3719-1995) with the maximum limit of bacteria is 2 x 10^2 colony / ml (2.301 logarithm of CFU / ml) and maximum limit existe of mold and yeast is 50 colony / ml (1.699 logarithm of CFU / ml). The percentage of degradation of yeast was the least, could be due to that many yeast have the heat resistant ability, besides the initial amount of yeast was the highest among all (Ray, 2001).

Table 1. Percentage of degradation of microorganisms during pasteurization process

Treatment	Microorganism	Initial Microorganism (Log CFU/ml)	Final (Log CFU/ml)	Percentage of degradation (%)
Pasteurization of 65°C	Bacteria	4.859	0.925	80.963
	Mold	2.920	0.591	79.760
	Yeast	5.051	1.383	72.619
Pasteurization of 77°C	Bacteria	5.211	0.709	86.394
	Mold	2.833	0.464	83.622
	Yeast	5.316	0.876	83.521

i = amount of initial microorganism (Logarithm of CFU / ml)
n = final count of final microorganism (Logarithm of CFU / ml).

During pasteurization at 65°C, the time that is needed to decrease bacteria's amount as 2.058 log of CFU / ml between 26.936 minutes until 33,67 minutes. Time that is needed to decrease mold's amount as 1.703 logarithm of CFU / ml between ke-6.734 minute until 13.468 minutes. Time that is needed to decrease yeast 1.699 log of CFU / ml between 45.67 minute until 51.67 minutes. During pasteurization at 77°C time that is needed to decrease bacteria's amount as 2.357 logarithm of CFU / ml between 25.376 minute until 31.72. Time that is needed to decrease mold's amount as 2.144 logarithm of CFU / ml between 0 minute until 6.344 minutes. Time that is needed to decrease yeast 1.706 log of CFU / ml between 43.72 minute until 49.72 minutes.
The initial amount of bacteria was higher than the initial amount of mold. The protection mechanism from heat at large population of microbia can cause the production of protective component that is produced by cell, for example protein (Jay, 2002). So the time that is needed to fulfill the maximum limit of bacteria is longer than mold.

Table 2. Heat Resistance Microorganism

Microorganism	Temperature	*D value*	*z value*	F_o (minute)
Alicyclobacillus	90°C	18 menit	6,6°C	90
Salmonella	150°F	0,172 menit	10°F	0.86
E. coli O157:H7	52°C	18 menit	4,8°C	90
Listeria monocytogenes	65°C	1,55 menit	7,5°C	7.75
	77°C	0,033 menit	7,5°C	0.165

F_o = *D value* *Logarithmic cycle (5)

Table 3. Evaluation of Heat Sufficiency

	Alicyclobacillus	*Salmonella*	*E. coli* O157:H7	*L. monocytogenes*	
F_o(minute)	90	0,86	90	0,165	7,75
ΣF_{count} 65°C (minute)	0,008	39,405	26150,377	47,747	-
Pasteurization Heating Sufficiency	not enough	enough	enough	enough	-
ΣF_{count} 77°C (minute)	0,480	5259,431	7597474,765	-	44,318
Pasteurization Heating Sufficiency	not enough	enough	enough	-	enough

F count = L = 10(T-Tref) / z with T is temperature process and Tref is standard temperature

Table 3 and 4 showed that *Allcyclobacillus* has a higher heat resistant ability so it will need higher temperature on heating process to destroy. It is showed by the unsufficient heat to destroy *Allcyclobacillus* during pasteurization at 65°C and 77°C. Heating at 65°C and 77°C of in guava juice are sufficient to destroy pathogenic bacteria *Salmonella, E. Colli O157:H7* and *L. Monocytogenes* as 5D.

Based on lethal rate and F value, pasteurization at 65°C and 77°C for 30 minutes could not destroy *Allcyclobacillus* as 5D because it is *thermoacidophilic* and includes forming endospores bacteria.

CONCLUSION

The viscosity, color intensity and TSS (Total Soluble Solid) increase during pasteurizatiuon process. While antioxidant and vitamin C decreased. Meanwhile, pH was not affected during pasteurization. Pasteurization at temperature of 65°C resulted in relativelly lower affect to physicochemical characteristics than 77°C. The heat pasteurization at 65°C and 77°C were sufficient to destroy microorganism until the permitted limit of SNI after 18 minutes heating. Pasteurization at 77°C reduced more percentage of microorganism than pasteurization at 65°C. Based on lethal rate and F value calculation to kill microorganism as many as 5D's, except *Alicyclobacillus* can not be killed as many as 5D's after heating at 65°C and 77°C.

REFERENCES

Anonim. (2006). Khasiat dan Produk Olahan Jambu Biji (*Psidium guajava L.*). http://www.pdii.lipi.go.id/wp-content/uploads/2007/07/432006

Astawan, M. & M.W. Astawan.(1991). Teknologi Pengolahan Pangan Nabati Tepat Guna. Akademika Pressindo. Bogor.

Chang., Muhammad, S., Nirmal. (1994). Plum Juice Quality Affected by Enzyme Treatment and Finning. Journal of Food Science.59.

Eskin. (1990). Biochemistry of Food. Academic Press. San Diego

Fellow, P. (2000). Food Processing Tenchnology : Principles and Practice Second Edition. Woodhead ublishing Limited. England.

Foster, T & Vasavada, P. C. (2003). Baverage Quality & Safety. CRC Press LLC. USA.

Les,A., & Margaret. (1998). Process-Induced Chemical Changes in Food : Sucrose Loose and Color Formation in Sugar Manufacture. Plenum Press. New York.

Pokorny, J; Nedyalka Y; Michael G. Antioxidant in Food. Woodhead Publishing Limited. England

Ray, B. (2001). Fundamental Food Microbiology Second Edition. CRC Press LLC. Boca Raton.

Terano, H.; K. Takahashi; & Y. Sakakibara. (2005). Characterization of Spore Germination of a Thermoacidophilic Spore-Forming Bacterium, *Alicyclobacillus acidoterrestris*. Biosci. Biotechnol. Biochem. 69(6), 1217-1220, 2005.

Zainal, B. S.; R. A. Rahman; A. B. Ariff;, B. N. Saari; & B. A. Asbi. (2000). Effect of Temperature on the Physical Properties of Pink Guava Juice at Two Different Concentrations. Journal of Food Engineering 43 (2000) 55 – 59.

Jay, J. M. (2000). Modern Food Microbiology. Aspen Publishers, Inc. Geithersburg.