PROCEEDINGS

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It is my great pleasure to welcome you here in Bandung, West Java, Indonesia to the first Padjadjaran International Conference on Halal Innovation. We are very grateful to the Rector and Director of Innovation and Academic Corporation and Business of Universitas Padjadjaran for their tremendous support they have provided and to the conference organizing committee for huge effort in engaging the program. We are also grateful to all of the speakers and participant for your extraordinary enthusiasm to participate in this event.

Halal market has increasingly grown across the world with both the increasing halal concern and muslim population growth as the main driving forces. To ensure halal compliance of food in the market, it is necessary to look at it from different point of views including method for halal analysis, methodology of halal food assessment, halal system management, screening of porcine/alcohol-based ingredients and alternatives of halal food ingredients. Therefore, all experiences of respective researchers, academicians, practitioners, government and professionals worldwide need to be gathered in a common unified voice in the form of a conference. Following the conference, it is expected to identify forthcoming chances and challenges with a view to strengthen halal food industry amongst muslim countries, establish a network, share idea and recent finding on halal food as well as launch Padjadjaran Halal Centre as the innovation center of excellent.

The conference will be held for two days and I sincerely hope you will enjoy the conference and have an interesting experience during your stay in Bandung.

Finally we thank for all parties participating in the conference.

Bandung, October 13 2016

Dr. Efri Mardawati

CONTENT

International Proceeding of :
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THE POTENCY OF VANILLA PASTA AS THE SOURCE OF HALAL AND NATURAL FLAVOR

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ABSTRACT

Vanilla pasta can be produced from different compositions of vanilla extract, sweetener, stabilizer, and thickener added with seeds of vanilla bean. The best composition is the one which contains pectin 2%, CMC 0,5%, 5 ml glucose, and 10 ml half-dry vanilla extract which has been evaporated. Another thing that distinguishes this product with the existing product flavor is the use of natural vanilla extract which has undergone evaporation to an alcohol content of up to 1%, which is very beneficial for the provision of halal flavor. Regarding the physical quality, this vanilla pasta of this composition is almost the same as of the commercial product. Regarding the purity of a product, this composition is better than of the commercial product because it does not contain ethyl vanillin. Thus, the vanilla pasta of this composition has great potency as the source of halal and natural flavor.

Key words: vanilla pasta, halal, natural, flavor

1. INTRODUCTION

Vanilla plant (*Vanilla planifolia Andrews*) is one of the herbal plant that has quite high economic value because it produces the vanilla flavor. Vanilla is also a mainstay of the agricultural sector of non-oil products because of abundance raw material and involving human resources pretty much (Suwandi dan Sudibyanto, 2004).

Indonesia is one of the vanilla-producing country in the world. The central of production area is Sumatra Utara, Lampung, Jawa Barat, Jawa Timur, Bali, Nusa Tenggara Barat, Nusa Tenggara Timur, Sulawesi Utara, Sulawesi Tengah, and Sulawesi Selatan (Ruhnayat, 2004).

Vanilla is a local commodity that is always exported, even not be used in the country due to high demand in the world. All this time vanilla is exported in dry form and has not further been processed into products flavor because of the technology process is not yet well understood. But to anticipate market developments, to provide added value for the processing of vanilla, and to open up markets for products based on vanilla Indonesia, efforts should be made to create derivative products. Another reason to make flavor products based natural vanillin is as a counterweight to the rise of synthetic food flavor today. Although the price of natural vanilla flavor is more expensive than synthetic one, the presence of that product will be accepted because its compounds are more complete and its use is safe for health.

Setyaningsih (2006) found that the curing process is modified by soaking vanilla beans in a solution of butanol 0,3 M plus 1 mM cysteine. Both of these substances are β-glucosidase enzyme activator that can hydrolyze glukovanilin into vanillin that gives a distinctive vanilla flavor and is one of the compounds forming the dominant vanilla flavor. Through the curing process can be proved that the level of vanillin obtained is higher than the way Balitro II curing method which has become standard curing vanilla in Indonesia. This research tried to make product based vanilla flavor of the modified curing results.

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The difference that stands out from the flavor of products with the flavor of products that already on the market is the use of half-dried vanilla curing modified results. The flavor product is **"vanilla pasta"** that can be used as a source of flavor in the manufacturing of food products such as ice cream, puddings, cakes, custards, cream, syrup, and others. Another thing that distinguishes this product with the product flavor is the use of natural vanilla extract which has undergone evaporation to an alcohol content maximum 1%, which is very beneficial for the provision of halal flavor.

The principle of making vanilla pasta is mixing (compounding) of raw materials into a homogeneous mixture. Vanilla extract raw material is mixed with sweetener, stabilizer, and thickener to obtain vanilla pasta product with a certain viscosity. The uniqueness of the vanilla pasta compared to other products is the existence of black seeds of vanilla bean, spread equally in all parts of the product. Vanilla pasta will be a well-preserved because it uses sugar as one of the ingredients so that it has sufficient a_w (water activity) to inhibit the growth of micro-organisms.

This research aims to develop a manufacturing process technology-based halal natural vanilla flavor - that is vanilla pasta; to compare the quality of this vanilla pasta with the commercial vanilla pasta; and to prove that vanilla pasta produced has some advantages compared with the commercial one because it contains no synthetic flavor components and alcohol content maximum 1%.

2. METHOD

Materials and Equipments

The materials used in this research consist of:

1. materials for modified vanilla bean curing process: fresh vanilla bean (*Vanilla planifolia* Andrews) bought from Kabupaten Kuningan –West Java, butanol, cycteine;
2. materials for making vanilla extract: ethanol 60%, water, sucrose;
3. materials for making vanilla pasta: a half-dried vanilla extract, glucose syrup 75 °Brix, pectin, CMC (carboxy methyl cellulose), vanilla seeds.

The equipments used consist of:

1. equipments for vanilla curing process: oven and a specially designed wooden box;
2. equipments for making vanilla pasta: knife, analytical balance, glass container, pan, hot plate, wooden stirrer, thermometer, *rotary vacuum evaporator*;
3. equipments for analysis of flavor components: HPLC (*High Performance Liquid Chromatogra-phy*) and glass tools.

HPLC specification:

Brand	:	Hewlett Packard 1100 Series
Column	:	Lichrosorph Rp 18
Length of column	:	200 x 4,6 mm
Mobile phase	:	methanol and water + glacial acetic acid (20 : 80)
Detector	:	UV
Flow rate	:	1 mL/minute
Pressure	:	198 mmHg
Injection volume	:	20 µl
Filter	:	PTFE 0,45 µm
Wave length	:	254 nm.

Research Method

This research consisted of three steps as follows:

1. material preparation:
   a. vanilla curing process untill a half dry,
   b. vanilla extraction process,
   c. vanilla extract evaporation process,
2. making vanilla pasta consists of:

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a. the selection of various types of thickeners,
b. trial and error of vanilla pasta making process,
c. main research with treatment type and amount of thickener,
3. measurement and observation of vanilla pasta quality,
4. comparison the quality of vanilla pasta produced with commercial vanilla pasta.

Material Preparation

In this step, curing process is carried out on vanilla bean until half dry using Setyaningsih (2006) method, the steps as follow:

a. fresh vanilla bean were *scratched* minimum three longitudinal lines;
b. soaked with butanol 0,3 M dan sistein 1 mM solution for 2 hours;
c. drained about 15 minutes;
d. scalded with water 40 °C for 30 minutes;
e. drained again about 1 hour;
f. sweated by wrapping with black cloth in the wooden box which was given sawdust around it about 18 hours;
g. dried in the oven 40 °C for 3 hours, step f dan g were done five cycles;
h. achieved the half dried vanilla bean.

The process flow chart of modified cured vanilla bean can be seen in Figure 1.

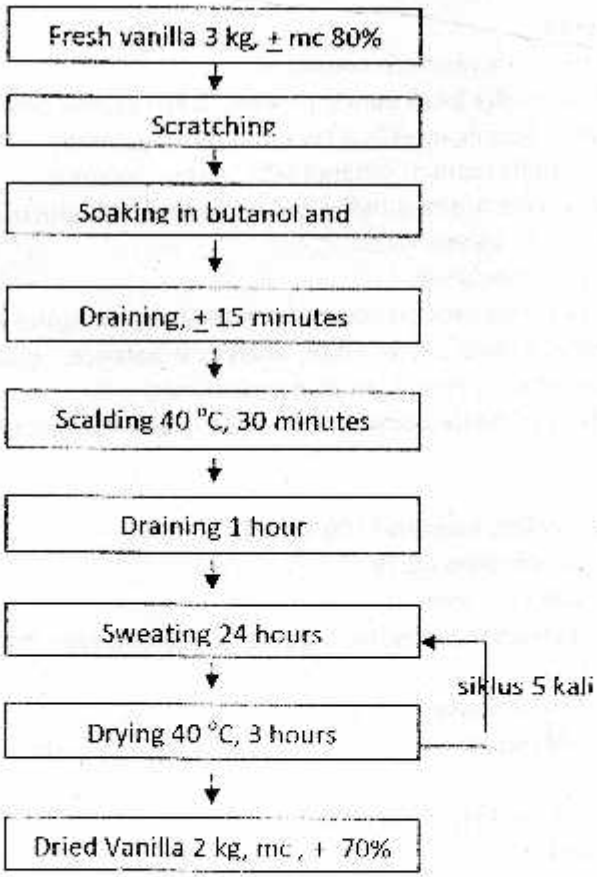

Figure 1 Process Flow of Modified Cured Vanilla Bean

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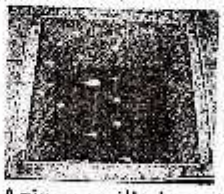
The process of curing process can be clearly seen in Figure 2.

Scratching 3 longitudinal lines

Soaking in Butanol 0.3 M and Sistein 1 mM solution

Scalding in water 40 °C for 30 minutes

Wrapping vanilla bean after draining



Aging vanilla bean

Drying in oven 40 °C

Gambar 2 Curing Process of Vanilla Bean

The making process of vanilla extract used Melawati (2006) method as follows:

a. half-dry vanilla beans were sliced 0,2 – 0,5 cm, put in glass container, add solvent (ethanol 60% and water), and then add sucrose with ratio of vanilla bean 30 gram : 70 ml ethanol : 30 ml water : 7,3 gram of sucrose;
b. vanilla beans were macerated (soaking) in the solvent about 15 days and stirred twice everyday;
c. filtered with filter cloth;
d. obtained *triple fold of vanilla extract*, dregs were discarded.

The making process of vanilla extract from a half-dry vanilla bean (moisture content about 78%) was showed in Figure 3.

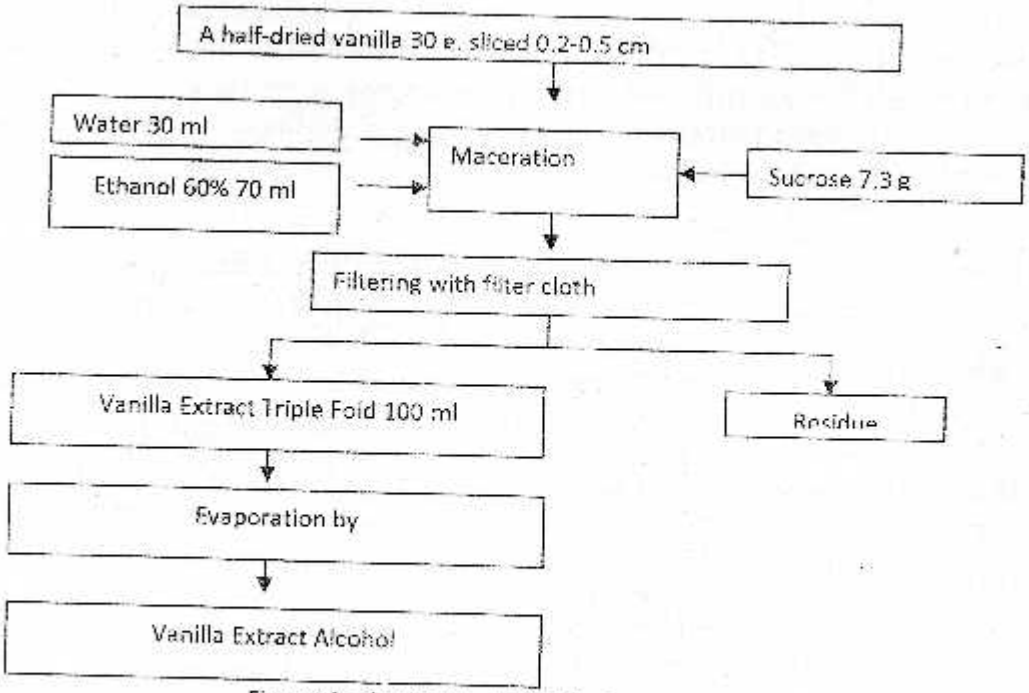


Figure 3 The Steps of Vanilla Extract Making Process

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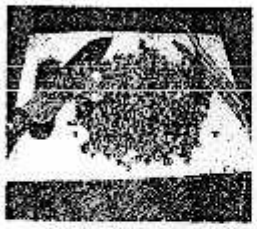
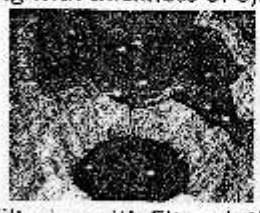
The colour of vanilla extract is brown with high ethanol content (about 30%) and vanillin content 2,18 g/L. The extraction process can be seen clearly in Figure 4.

Half-dry vanilla beans



Slicing with thickness of 0,5 cm

Maceration



Filtering with filter cloth

Figure 4 Vanilla Extract Making Process Used Maceration Method

Alcohol evaporation used *rotary vacuum evaporator* with conditions as follow: evaporation temperature 40 °C, speed 150 rpm, extract volume 300 mL, time 3 hours, obtained end volume about 160 -170 mL. After evaporation, vanilla extract become more concentrated with ethanol content 1% (analyzed by alcoholmeter) and vanillin content 3,74 g/L.

The Making Process of Vanilla Pasta

This step aimed to develop a process technology to make vanilla pasta with selection of thickener type, determination of concentration range of thickener and sweetener, and determination of processing ways. Determination of the amount of treatment was based on the test results of the formula. There were two factors, each of which consists of 4 levels, so that the total number of 16 combined treatment (Table 1).

Table 1 Details All 4 Levels for Each Factor

FACTOR A: Type and Thickener Concentration	FACTOR B: Sweetener Concentration
P_1 = Pectin 1%	G_2 = Glucose Syrup 2,5 mL
P_2 = Pectin 2%	G_5 = Glucose Syrup 5 mL
T_1 = Gum "X" 1%	G_7 = Glucose Syrup 7,5 mL
T_2 = Gum "X" 2%	G_{10} = Glucose Syrup 10 mL

The combination of these two factors resulted a vanilla pasta formula. The total volume of vanilla pasta for each formula was not analogous, depending on the amount of sweeteners added. For example P1G2 formula had a volume of approximately 12.5 mL because it came from a mixture of 10 mL of extract with 2.5 mL of glucose syrup. The factors that remained in each treatment were:

1) the number of half-dried extract 10 mL;
2) the sweetener used was 75 °Brix glucose syrup.

The experimental design was completely randomized factorial with two replications so that the number of treatment as much as 16 formula with the total number of 32 experimental units.

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Measuring of Vanili Pasta Quality

Quality properties that were measured include:

1.viscosity, measured by visual observation;

2.stability of vanilla bean seeds, measured by visual observation;

3.aroma of vanillin, measured by smelling vanilla pasta.

Quality Comparison between Vanilla Pasta Produced and Commercial Vanilla Pasta

The physical quality of vanilla pasta produced was compared to the physical quality of commercial vanilla pasta. In addition, the vanilla pasta produced and commercial vanilla pasta were checked whether totally natural by analyzing the flavor components of those vanilla pasta with HPLC (High Performance Liquid Chromatography).

3. RESULTS AND DISCUSSION

The drying process in the processing of fresh vanilla bean until moisture content around 25% is known as curing. The curing process of vanilla beans is intended to get aroma and flavor of vanilla, in addition to lower the water content. According to Rao and Ravishankar (2000) fresh vanilla beans are almost odorless. Aroma will develop after the curing process. This occurs because of enzymatic reactions in the flavor components (clusters of glycosides) by the enzyme β-glycosidase produce various components of vanilla flavor.

In Indonesia, the curing process has been developed by Balittro (Research Institute for Spices and Medicinal Plants), Bogor. This study used a modified drying which was the result of research of Setyaningsih (2006), which proved to have higher levels of vanillin compared Balittro methods. The things that differentiated from Balittro method were soaking in an enzyme activator, that was solution of butanol 0,3 M and 1 mM cysteine, also scalding temperature and drying temperature.

According to Setyaningsih (2006), butanol can act as an activator of enzyme because enzyme tends to use alcohol than water as the receiving part of glycosyl so that it can increase the reaction. The mechanism can be explained as follows: through hydrogen bond, hydroxyl groups of n-butanol bound to the enzyme β-glucosidase. In addition, the hydroxyl group of butanol can be soluble in water through the system of one phase cosolvent, that is the system that dissolves the organic solvent - in this case is butanol - in a buffer solution (water) in one phase. Thus the enzyme is able to bind water. The presence of water causes the enzyme to be more flexible so that more easily bind with the substrate.

Cysteine can also act as an activator of enzyme. The mechanism can be explained as follows: S-H group in cysteine can help the stability of the enzyme structure because S-H group is easily oxidized. If the oxidation reaction occurs, S-H group will be firstly oxidized so that enzyme can be protected and its activity is not disrupted.

Material Preparation

Vanilla drying process do not dry properly, so the end result of drying process until the fifth day termed the "half dry vanilla". The water content of fresh vanilla or moisture drying at day 0 is still high, amounting to 87.96%, while the water content in the drying at fifth day has decreased 9.65% compared to day 0 in order to obtain a yield of 78.31% (Figure 5).

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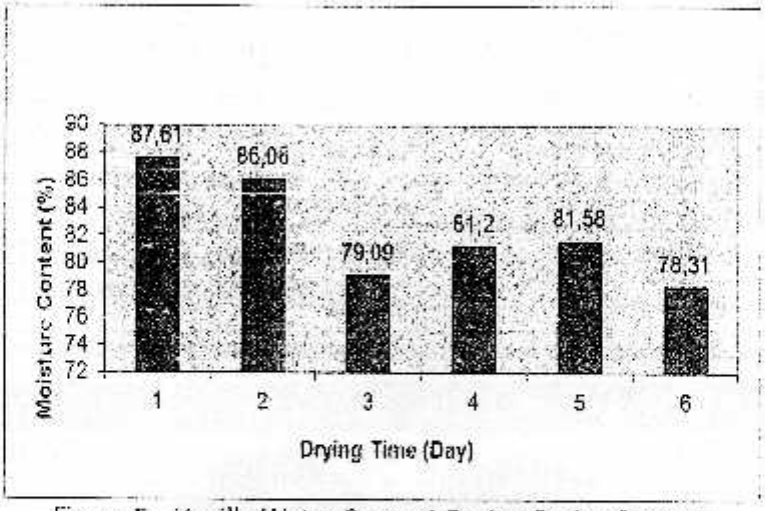

Figure 5 Vanilla Water Content During Drying Process

At the beginning of the drying, the levels of vanillin was still small, but would increase in line with the length of drying. After drying at fifth day, the levels of vanillin reached 2.7%, almost the same as the results of Setyaningsih et al (2003), that was 2.8%, and greater than vanilla dried by standard methods (Balittro) was only 1.2%. Increasing vanillin level each day indicated that more glukovanilin were hydrolyzed to glucose and vanillin caused by soaking in the activator enzyme (butanol 0.3 M and cysteine 1 mM solution).

Making Process of Vanilla Pasta

In the beginning stages of making pasta vanilla, there was the selection step for various types of thickener, namely xanthan gum, guar gum, sodium alginate, carrageenan, pectin, CMC, gum arabic, and gum "X". Selection of the eight types of thickeners was based on aroma and solubility in water and its ability to form "pasta" when formulated and heated together with the vanilla extract and glucose syrup untill formed viscous and flowable pasta. Based on the results obtained, it was determined the types of thickener tested next were pectin, gum "X", and CMC. The other observation result was a combination of two types of thickener would produce a pasta with better texture than by using only one type of thickener.

From the test results on the processing of pasta known that thickeners, vanilla seeds, and glucose syrup evenly first stirred while heated on a hot plate, finally added the extract, stirred constantly to mix homogeneous until the temperature reaches 60 ° C. If the extract, seeds, and thickener were mixed first, it would not be obtained a homogeneous mixture as thickener was difficult to dissolve. Besides, the extract would be longer in contact with the heat and also more flavor components would disappear. At the end, tried to combine the treatment of type and amount of thickener (P1: pectin 1%, P2: pectin 2%, T1: gum "X" 1%, T2: gum "X" 2%) and the amount of glucose syrup (G2: 2,5 mL, G5: 5 mL, G7: 7,5 mL, G10: 10 mL).

Measurement and Observation Quality of Vanilla Pasta

Visual observation of the 16 samples are presented in Table 1. The results show that pectin is better than gum "X" because it can produce a good seed stability. Based on seed stability and viscosity, then selected sample P2G5 namely vanilla pasta with the addition of pectin 2% and 5 mL of glucose syrup.

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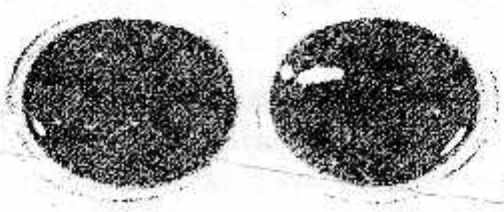
Table 1 Visual Observation of the 16 Samples

SAMPLE	SEED STABILITY	VISCO-SITY	VANILIN AROMA
P_1G_3	Many seeds settle	Aqueous	Detected
P_1G_5	A little seeds settle	Slightly Aqueous	Detected
P_1G_7	Seeds not settle	Slightly viscous	Slightly Detected
P_1G_{10}	Seeds not settle	Slightly viscous	Slightly Detected
P_2G_2	Seeds not settle	A little slightly viscous	Detected
P_2G_3	Seeds not settle	Slightly viscous	Detected
P_2G_7	Seeds not settle	Slightly viscous	Slightly Detected
P_2G_{10}	Seeds not settle	Slightly viscous	Slightly Detected
T_1G_2	Many seeds settle	Aqueous	Detected
T_1G_5	Many seeds settle	Aqueous	Detected
T_1G_7	Many seeds settle	Aqueous	Slightly Detected
T_1G_{10}	Many seeds settle	Aqueous	Slightly Detected
T_2G_2	Many seeds settle	Aqueous	Slightly Detected
T_2G_5	Many seeds settle	Aqueous	Slightly Detected
T_2G_7	Many seeds settle	Aqueous	Slightly Detected
T_2G_{10}	Many seeds settle	Aqueous	Slightly Detected

From Table 1 above shows that the pectin is better than gum "X" because it can produce a good seed stability. Vanilla seeds have a good stability if the seeds do not precipitate and can be distributed throughout the pasta. The stability of the seeds are needed in vanilla pasta because it is more practical in every use (do not need to be stirred or shaken). In addition, seeds that settled will look less attractive if compared with the seeds evenly distributed. Vanilla Pasta made with the addition of gum "X" of 1-2% do not have the seeds stability and not good viscosity. Vanilla seeds can not be retained in the pasta but mostly settle. The seeds stability is closely related to the viscosity. If the viscosity is aqueous, it will cause the seeds easily precipitate. Gum "X" may produce good seeds stability and good viscosity when its concentration is increased. But this is not desirable because it will reduce the concentration of vanilla extract in vanilla pasta that will cause the aroma of vanilla flavor becomes unreal, otherwise aroma gum "X" will be more dominant. Physical form differences of vanilla pasta that use pectin and gum "X" can be seen in Figure 6.



A B

Figure 6 Physical Form of Vanilla Pasta T_2G_5 (A) dan P_2G_5 (B)

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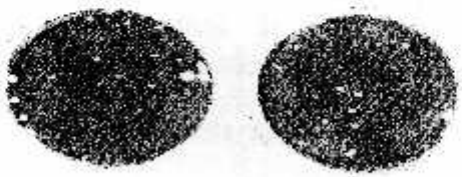
Pectin concentration of 1% and 2,5 mL of glucose syrup causes not good seed stability due to the viscosity is aqueous so that it is unable to withstand the seeds in order not to precipitate. If the amount of glucose syrup increases to 5 mL (pectin concentration of 1% fixes) it will produce a better seed stability due to its viscosity increases. At the rate of 1% pectin concentration, the seeds do not precipitate if the glucose syrup is added to 7,5 mL and 10 mL. The addition of 2% pectin will cause the seeds do not settle and viscosity is slightly thick. Based on the seed stability and viscosity also the intensity of vanillin aroma, then selected sample of vanilla pasta namely P2G5 with the addition of 2% pectin and 5 ml of glucose syrup.

Quality Comparison between Vanilla Pasta Produced and Commercial Vanilla Pasta

Comparison between P2G5 with commercial products can be seen in Figure 7.



A B

Figure 7 Vanilla Pasta P_2G_5 (A) and Commercial Pasta Vanilla (B)

Figure 7 shows that the vanilla pasta produced has a darker color than the commercial vanilla pasta, but in terms of the distribution of seeds, both are almost the same. From the measurement of aroma, commercial vanilla pasta has aroma of vanillin sharper than the vanilla pasta produced. It was alleged that commercial vanilla paste made of natural vanilla extract mixed with synthetic vanilla extract.

To determine the authenticity of commercial vanilla pasta, then analyzed the levels of ethyl vanillin using HPLC with external standard solution of ethyl vanillin concentration of 0,4 g/L. The results showed that the commercial vanilla paste contained ethyl vanillin of 5.49878 g/L, exceeding the levels of vanillin which only amounted to 0.79919 g/L (Figure 8 and 9). Thus, commercial vanilla pasta is not natural because ethyl vanillin flavor not found in nature and the intensity is 3-4 times the vanillin. That is why vanillin aroma of commercial vanilla pasta is sharper than vanilla pasta produced. Instead, vanilla pasta produced does not be doubted its authenticity because it does not contain ethyl vanillin.

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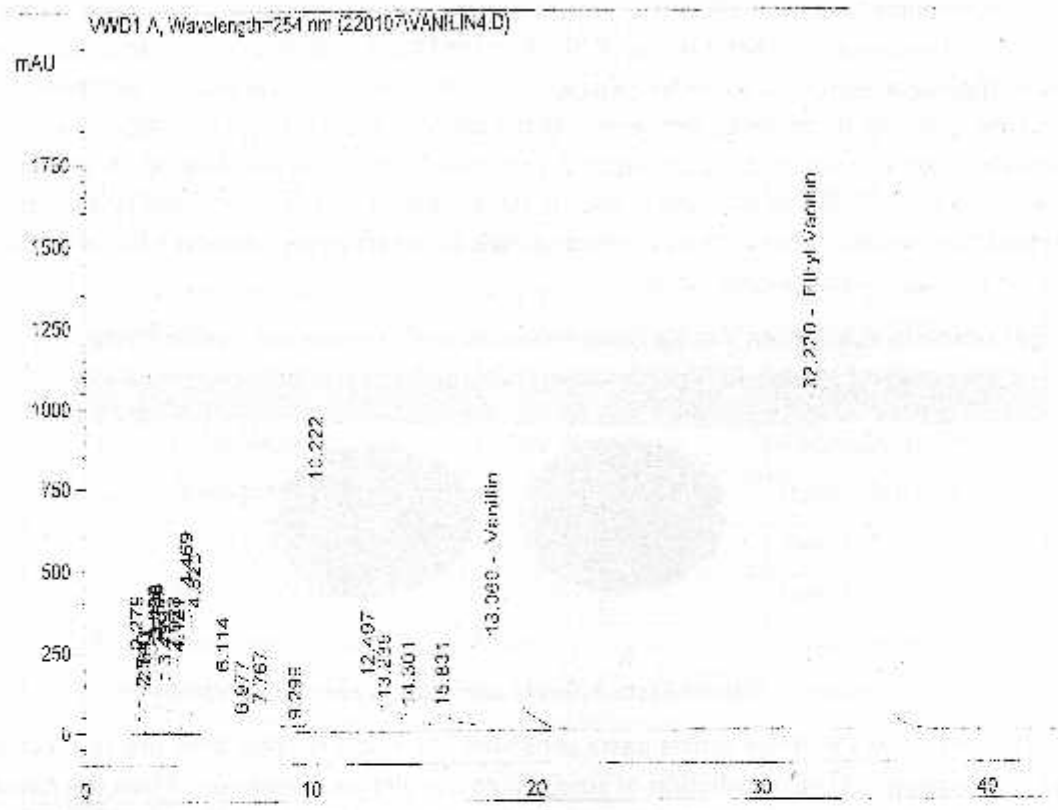
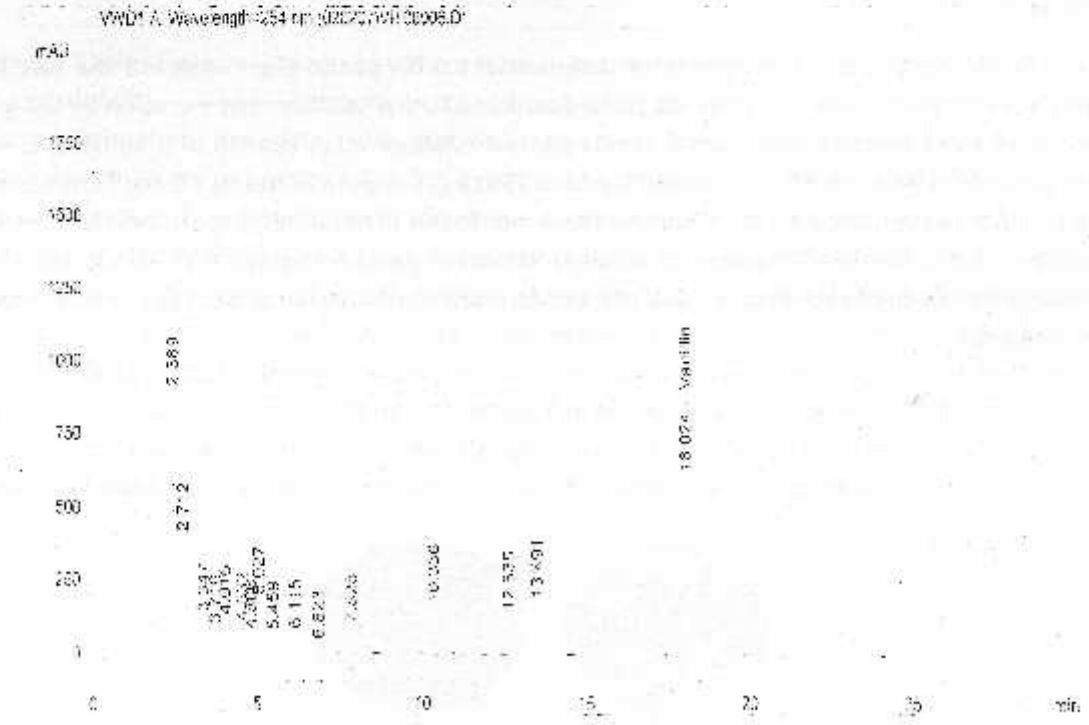


Figure 8 Cromatogram of Commercial Product



Gambar 9 Cromatogram of Research Product

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4. CONCLUSION AND SUGGESTION

Conclusion

The best vanilla pasta is made with pectin 2%, CMC 0,5%, glucose 5 mL, and the concentrated extract 10 mL. This vanilla pasta contents alcohol maximum 1%, according to "Fatwa" from Indonesian Council of Ulama. The vanilla pasta has almost the same quality with commercial vanilla pasta and has an advantage because it does not contain ethyl vanillin. Thus, vanilla pasta that is produced from this research has a potency for providing halal and natural flavor.

Suggestion

As a continuation of this study, need to be done a comprehensive sensory analysis in the form of test descriptive using semi-trained panelists. In addition, it is also necessary to be done a research to apply this vanilla pasta for food products that commonly use vanilla flavor.

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