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Test Production Model on Varieties to Produce Quality Sesame Oil

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***Abstract*— *The potential of local regions determines the progress of agro-industry. The aim of the study was to determine the effect of drying models and varieties on the levels and quality of sesame oil. The research method used factorial complete randomized design, namely the first factor was drying using the oven and roasting method. The second factor is 5 sesame varieties namely SBR1, SBR2, winnas1, Winnas 2 and independence. Parameters observed included seed moisture content, oil content, oil aroma, oil taste and oil color. The results of the study show that there are interactions between the use of varieties and heating models.*

Keywords*— *Sesame, oil, quality, aroma, bright color, taste

I. INTRODUCTION

To develop agroindustrial sector, it needs the right policies (Syam & Ma'arif, 2004). Especially the policies regarding raw material (Budi, Rahayu, & Hanafi, 2010). The quality of raw material will determine the quality of the final product. A research that done by Budi (2011) about some processing types in producing sesame oil before splitting process, such as roasting or drying (Budi, 2011). Temperature and duration of heating of the raw material influences the quality of the oil that produced, excessive heating can reduce the oil quality (Romadhona, Lutfi, & Yulianingsih, 2015a), (Mulyati, Pujiono, & Lukis, 2015). Besides of temperature and duration of heating of the raw material, the types of raw material also gave some effects to the quality of the final product. It happens in sesame agroindustry too (Budi, Maarif, Sailah, & Raharja, 2009). Characteristics of sesame seeds are divided based on the size of the seeds, the color of sesame shell, and the shape of the seeds (Budi, 2011). The cultivation place of the raw material will influence the quality of oil produced (Budi, 2011). The quality of sesame oil is divided into the color of the oil, the taste of the oil, and the aroma of the oil (Handajani, et al., 2010). The quality of sesame oil influenced by the raw material, if the quality of the raw material were good the oil that produced would be good too.

The purpose of this research was to determine the effect of the drying models, the variety of sesame seeds in the quality of production the sesame oil, and to know the correlation between the variety of sesame seeds with the quality of sesame oil. The purpose of this research was to determine the effect of drying models and difference varieties on the levels and quality of sesame oil (moisture content, oil content, oil aroma, oil taste and oil color) and to determine the relationship between the characteristics of varieties with oil quality. The quality of the oil will contribute in economic value or selling value of the oil (Budi & Wardhani, 2017). The high quality of sesame oil will use as supplement and the low quality of sesame oil will use as seasoning. The high quality of sesame oil has a unique aroma, bright color, and good taste (Wiyono, 1994).

II. MATERIAL AND METHODS

1.1 Place and time

This research was done in processing of Pengolahan Hasil laboratorium, Merdeka Madiun University on May until August 2018.

1.2 Material and tools

The material that used in this research was five varieties of sesame seeds which is SBR1, SBR2, Winnas 1, Winnas 2, and H2. The tools that used in this research was test tube, beaker glass, oven, pan, stove, grinder, hydraulic press, monel fabric, scales, pipettes, filter paper, and others.

1.3 Methods

The method of this research is factorial completely randomized design. The first factor is five varieties of sesame seed. The second factor is roasted (P1) and oven (P2). Each treatment has five samples and is done three times.

1.4 Research Stage

As for the stages of this research shown in the Figure

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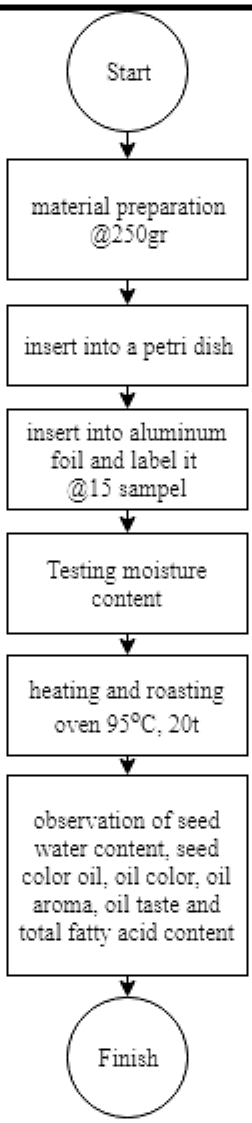

Fig. 1: research stage

1.5 Data Analysis

The result of organoleptic testing which is color, taste, and aroma then tested quantitatively. The quantitative method that used to analyze the data is multiple comparison tests and the correlation between parameters using SPSS software. Duncan test with confidence level is 0.5%.

III. RESULTS AND DISCUSSION

3.1. Result

Figure 1 shows if the weight every 1000 seeds is significantly different. Figure 1 shows that sesame which has the highest score is W2P2 (3.78g).

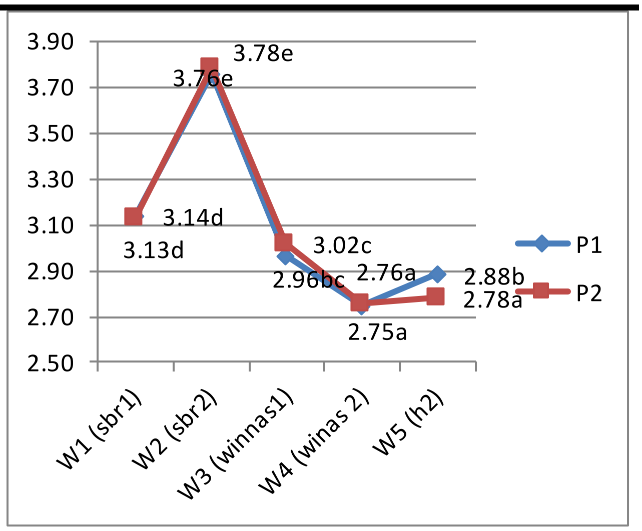

Fig. 1: The average weight of 1000 seeds

Tabel 1. The average of seed water content

Water Content	Average score (%)	
W1P1 (SBR1 variety *roasting)	2.99	d
W1P2 (SBR1 variety *oven)	2.78	d
W2P1 (SBR2 variety *roasting)	3.03	e
W2P2 (SBR2 variety *oven)	2.78	ab
W3P1 (Winnas1 variety *roasting)	2.88	bc
W3P2 (Winnas 1 variety *oven)	2.80	ab
W4P1 (Winnas2 variety *roasting)	2.96	cd
W4P2 (Winnas2 variety *Oven)	2.77	ab
W5P1 (H2 variety *roasting)	2.88	bc
W5P2 (H2 variety *Oven)	2.71	a

Table 1 shows that water content is significantly different. The highest score of the water content is W2P1 (3.03%) and significantly different to the other treatments. The lowest score of the water content is W5P2 (2.71%).

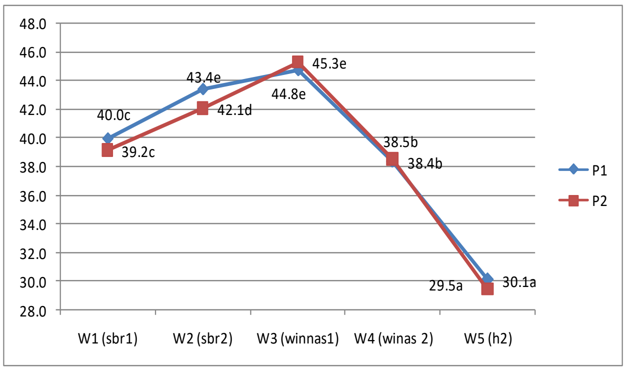

Fig. 2: The average score of oil content

Figure 2 is the analysis result for oil content. The result is the variety of sesame seeds having interaction with the drying model. W3P1 treatment combination has the highest oil content with the value 45.30% and

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significantly different with the other treatment. The lowest oil content is W5P1 with the value 29.5% and does not significantly different with P2.

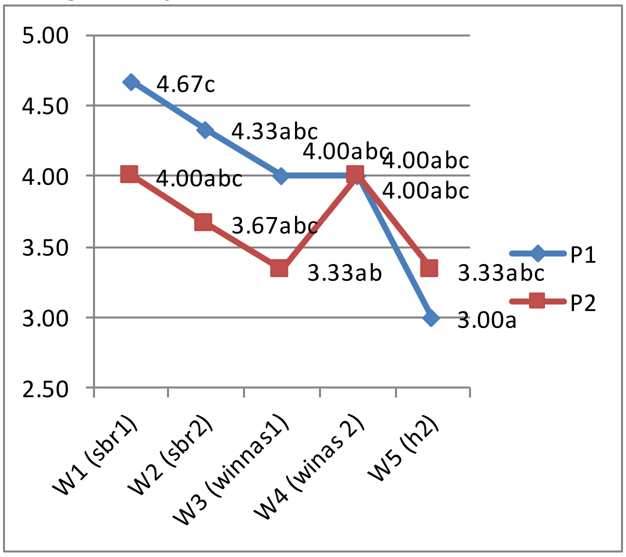

Fig. 3: The average of the color value

Figure 3 is the result of the organoleptic test of the color of sesame oil which has significantly different. The best color is W1P1 with the score 4.67 and significantly different with W5P1, while does not significantly different with the other treatments.

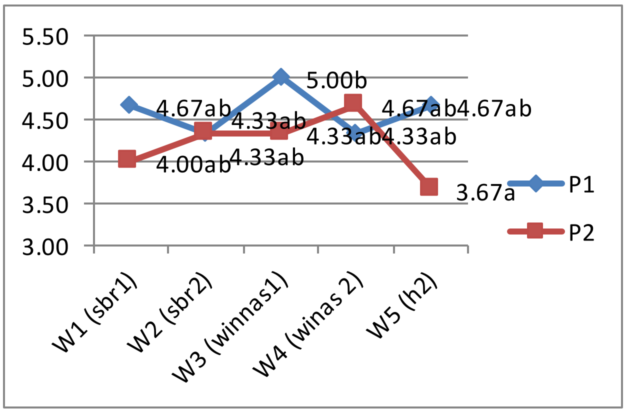

Fig. 4: The average score of aroma

Figure 4 shows the result from aroma organoleptic testing. The result is the combination of treatment has significantly different with the aroma. The W3P1 has a specific smell and significantly different with W5P2 and does not significantly different with the others.

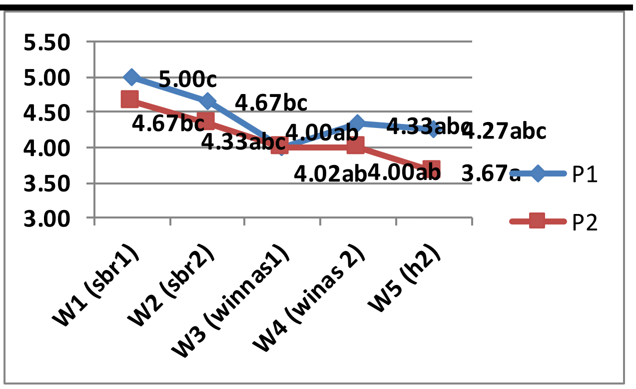

Fig. 5: The average score of sesame oil taste

Figure 5 is the result of sesame oil taste. The combination treatment has significantly different with the sesame oil taste. Figure 5 shows that W1P1 has the highest score with the value 5.00, and significantly different with W5P2.

Table 2 is the result for fatty acid analysis. There is any significant interaction from the combination of sesame variety and the drying model. W1P1 and W1P2 has the highest score for total fatty acid (95%) and significantly different with the other treatment. The lowest total fatty acid is W4P1 and W4P2 with a score of 84%.

Table 2. The average score of fatty acid influences from combination of variety of sesame and the drying model

Oil Aroma	The Average Organoleptic Score	
W1P1 (SBR1 variety *roasting)	95.00	f
W1P2 (SBR1 variety *oven)	95.66	f
W2P1 (SBR2 variety *roasting)	90.48	e
W2P2 (SBR2 variety *oven)	90.50	e
W3P1 (Winnas1 variety *roasting)	90.26	d
W3P2 (Winnas 1 variety *oven)	90.95	d
W4P1 (Winnas2 variety *roasting)	84.08	a
W4P2 (Winnas2 variety *Oven)	84.06	a
W5P1 (H2 variety *roasting)	85.13	c
W5P2 (H2 variety *Oven)	85.44	b

Table 3 is the result of correlation analysis for each research factor. Table 3 shows that the weight of 1000 seeds has a strong correlation with the oil content in the value of 0.500**, and the total of fatty acid with the value 0,516**. Water content and the taste of oil has a correlation, and the value is 0.394*. The correlation of oil content and the total fatty acid has score 0.533**.

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Table 3. Correlation between observational parameters

		wight_of_ 1000_seeds	Water_ content	taste_of_oil	Oil_Content	Total_fatty_ Acids
wight_of_1000_seeds	Pearson Correlation	1	.232	.278	.500**	.516**
	Sig. (2-tailed)		.217	.137	.005	.004
	N	30	30	30	30	30
Water_content	Pearson Correlation	.232	1	.394*	.230	.190
	Sig. (2-tailed)	.217		.031	.222	.314
	N	30	30	30	30	30
taste_of_oil	Pearson Correlation	.278	.394*	1	-.058	.342
	Sig. (2-tailed)	.137	.031		.763	.064
	N	30	30	30	30	30
Oil_Content	Pearson Correlation	.500**	.230	-.058	1	.533**
	Sig. (2-tailed)	.005	.222	.763		.002
	N	30	30	30	30	30
Total_fatty_Acids	Pearson Correlation	.516**	.190	.342	.533**	1
	Sig. (2-tailed)	.004	.314	.064	.002	
	N	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.2 Discussion

The Duncan multiple tests (p = 0.05 and 0.01) indicate that all parameters are significantly different. It because variety and drying model is significantly different. The high of drying temperature will reduce the moisture content of the seeds, and impact to the final result (Derlean, 2009). Besides that, the weight of 1000 grains has a potential effect in produce oil with good quality and has high economic value. The weight of 1000 seeds has the potential to produce high oil (Hagose, 2017)

The drying model gave a significant impact on water content, oil content, and the quality of sesame oil (taste, aroma, and color). It suspects the different drying model will give a different quality of sesame oil (Romadhona, at.al 2015), but the increases of the temperature will not impact to the increasing of the extraction (Elkhaleefa & Shigidi, 2015).

The highest correlation occurs between the weight of 1000 seeds with oil content and total fatty acid. It is because if the weight of seeds increases then the oil content and the total fatty acid will increase too. Budi (2011) stated some variety of sesame with different weight has different oil content, increasing the volume of raw material is positively correlated with oil content (Wildan et al, 2013).

II. CONCLUSION

The combination of the treatment and drying model has significantly different. Variety of sesame is very influential to the oil produced quality (oil content, oil color and total fatty acid). The best varities to provide the high quality of sesame oil is has the highest weight 1000 seeds, positively correlated with oil content and total fatty acid. The model drying is very influential to oil taste and oil aroma. The roasted models provide high oil quality (aroma and taste of sesame).

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