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ORGANOLEPTIC ASSESSMENT OF MILK IN DAIRY COW CONSUMING DEPOLARIZED KATUK'S LEAVES

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Abstract. Depolarizing Katuk Leaf (DKL) is known to be able to increase milk production in dairy farms, but until now the level of sensory (Organoleptic) markers in consumers is unknown. The study aimed to conduct an organoleptic assessment of fresh milk from dairy cows that consumed about 100 g daily DKD in the form of powder (DKL-1) and pellets (DKL-2) mixed in commercial complete feed for 45 days. One liter of milk samples was collected from 7 dairy cows at PT. Great Giant Livestock-Central Lampung for each treatment group, namely, Control, DKD-1, and DKL-2. The organoleptic assessment was carried out with sensory characteristics, namely appearance, flavor, taste, mouthfeel, and aftertaste. A series of sensory evaluations were carried out on 8 trained panelists. Overall, the sensory characteristics of fresh milk from dairy cows treated with DKL-1 and DKL-2 showed a good sensory response compared to milk in the control group, with the average value of intensity rating sequentially (4,39 ± 2,29) and 5,52 ± 2,54) compared to milk control that is (3,97 ± 2,06). Fresh milk from pelleted cows (DKL-2) showed a very good sensory response from the panelists compared to milk in the control group ($P<0.05$).

Keywords: Katuk leaf, dairy milk; organoleptic.

INTRODUCTION

Katuk leaf (Sauroupus androgynous) is known in Indonesian society as a vegetable and is efficacious as a trigger for milk production in nursing mothers. This is understandable given the influence of active compounds in katuk leaves which can increase hormonal levels. Putranto *et al.* (2017) said that 3% katuk leaf supplementation in *kacang* goat feed was able to increase reproductive hormone levels (progesterone and estrogen-17β) in the blood of female *kacang* goats. Giving katuk leaf supplements to male *kacang* goats also shows a hormonal role, and can increase the production of spermatids and spermatocytes in the testes of goats (Farasyi *et al.*, 2014). Suprayogi (2000) said that the active compound of katuk leaf through hormonal and metabolic mechanisms is known to increase the number of secretory cells in the udder of lactating ewe, but still shows unexpected side effects on the respiratory system of sheep. Given these side effects, Suprayogi *et al.*, 2013 carried out a depolarization process on dried katuk leaves and tested

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it on smallholder dairy cows with a consumption dose of 100 g per day, the results showed an increase in milk production of 35.21% from the control group. The depolarizing katuk leaf process technology (DKD), can eliminate polar chemical compounds, thereby suppressing side effects. This depilated katuk product has been marketed under the Katulac® trademark as a feed additive to trigger milk production in dairy cows (Suprayogi (2017). The ability of DKD to increase cow's milk production is well known to the public, but until now the level of sensory characteristics (Organoleptic) is unknown to consumers. It is expected that an increase in the volume of milk production in dairy cows is also followed by good milk quality and acceptable taste by consumers. The purpose of this study was to conduct an organoleptic assessment of fresh milk from dairy cows that consume about 100 g of DKD per day in the form of powder (DKD-1) and pellets (DKD-2) mixed in commercial complete feed for 45 days.

METHOD

The research was conducted at PT. Great Giant Livestock (PT. GGL)-Central Lampung, is a commercial farm in Indonesia. Twenty-one (21) lactating dairy cows were divided into 3 groups of 7 each, namely the control group, the depolarized katuk leaf group in powder form (DKL-1), and in pellet form (DKL-2). The cattle control group only consumed commercial complete feed for lactating cows from PT. GGL ad libitum was around 35 kg per day, while the other group received additional DKL powder (DKL-1) and additional DKL pellets (DKL-2) each 100 g per day for 1.5 months. One liter of fresh milk samples was collected from 7 dairy cows using a milking machine for each treatment group. The organoleptic assessment was carried out at the Nutrition Analysis Services Laboratory, Faculty of Human Ecology, IPB University. Certificate Number 01/LJAG-IV.7.8-3.1/XI/21, with sensory characteristics, namely appearance, flavor, taste, mouthfeel, and aftertaste. A series of sensory evaluations were carried out on 8 trained panelists based on ISO 8586:2014 with an intensity rating value of each characterizing the results of Quantitative Descriptive Analysis (QDA) on three fresh milk samples based on ISO 11132:2012. The intensity rating value is determined to range from 0 to 10, where 0 indicates the lowest intensity and 10 indicates the highest intensity. The specifications of the sensory characteristics can be described in Table 1 below:

Tabel 1. The specifications of the sensory characteristics

Characteristics	Specific Characteristics	Description
Appearance	Yellowness	The degree of yellow color, a color between green and orange in the spectrum, a primary subtractive color complementary to blue; colored like ripe lemons

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	Agglomeration	The appearance of an assemblage or mass or collection of things
	Shininess	A reflecting light surface
	Opaqueness	An opaque surface, no reflecting light
	Fatty appearance	Containing a significant amount of fat
	Homogeneity	A uniform quality or state of being all the same or all of the same kind
	Viscosity	The degree of thickness due to the amount of total solid
Flavor	Milky	Flavor or aroma of milk
	Buttery	Flavor or aroma like butter
	Floral	A flavor sensation associated with grass and floral
Taste	Savory	A category of umami taste in food (besides sweet, sour, salt, and bitter), corresponding to the flavor of glutamates, especially monosodium glutamate
	Sweetness	The degree of sweet taste
	Saltiness	Tasting of, containing, or preserved with salt
	Creaminess	The degree of taste resembling cream
Mouthfeel	Fattiness	Feeling in the mouth of containing a large amount of fat
	Thickness	The sense of being thick and semifluid in consistency, due to the significant amount of total solid
Aftertaste	Fatty aftertaste	Aftertaste sense containing a large amount of fat left after swallowing the sample

RESULT AND DISCUSSION

The value of the intensity rating of each sensory characteristic (QDA) namely appearance, flavor, taste, mouthfeel, and aftertaste in three samples of fresh milk is presented in Table 2. Overall, the sensory characteristics of fresh milk from dairy cows treated with DKL-1 and DKL-2 showed a good sensory response compared to milk in the control group, with an average intensity rating value (4.39 ± 2.29) and 5.52 ± 2.54) compared to control milk, namely (3,97 ± 2.06). The highest intensity value given by the panelists with high significance was in the sample of fresh milk treated with DKL-2 compared to the sample in DKL-1, as well as control, including yellowness, agglomeration, shininess, fatty appearance, fatty mouthfeel, thickness, and fatty aftertaste. The value of these sensory characteristics is closely related to the nutritional composition of milk. The high value of sensory characteristics in DKL-2 fresh milk is very possible, considering that giving DKL to dairy cows can increase the volume and synthesis of milk nutrients in the

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udder secretory cells, including fat, protein, lactose, and milk solids (Suprayogi, 2017). Mirdhayati *et al.* (2008) reported that the nutritional content of fresh milk in smallholder dairy cows in Kampar District, Riau Province with average milk production of only 5-6 liters per day, the namely fat content of 1.6% ± 0.37, protein 3.87% ± 0 .99, and ash 0.91% ± 0.01, indicating a low-quality value of milk, especially in fat content based on the Indonesian National Standard (SNI) 3141.1:2011. The description of the nutritional composition of this milk based on the QDA results shows that the value of the sensory characteristic for aroma is only 3.8 and taste is 3.9. Meanwhile, Table 2 shows that the average value of aroma and taste in fresh milk samples of DKL-2 are (4.92 ± 2.58) and (5.03 ± 2.68), respectively. It is possible, based on these sensory characteristics, fresh milk in cows consuming DKL-2 has a fairly high nutritional content of milk. Until now, there is no information why the DKL-1 treatment has not shown a significant response compared to the control group, even though both DKL-1 and DKL-2 contain Depolarizing Katuk Leaf. The possibility of processing katuk leaf powder into pellets with the carrier material affects the taste of complete feed in dairy cows.

Tabel 2. The rating intensity value of each specific characteristic from QDA on three fresh milk samples

Characteristics	Specific Characteristics	Fresh milk from the three treatment groups of dairy cows		
		Control	DKL-1	DKL-2
Appearance	Yellowness*	3.25 ± 1.83^{a}	3.63 ± 1.60^{a}	6.63 ± 1.60^{b}
	Agglomeration*	3.38 ± 1.85^{a}	2.38 ± 1.85^{a}	5.63 ± 2.39^{b}
	Shininess*	4.50 ± 1.85^{a}	4.38 ± 2.92^{a}	5.88 ± 2.36^{ab}
	Opaqueness	3.00 ± 1.51^{a}	2.13 ± 1.36^{a}	5.13 ± 3.09^{b}
	Fatty appearance*	4.38 ± 1.92^{a}	3.50 ± 2.39^{a}	6.38 ± 2.07^{b}
	Homogeneity	6.13 ± 1.81	7.13 ± 2.36	6.38 ± 1.69
	Viscosity	4.00 ± 2.20	4.25 ± 3.06	5.88 ± 3.09
Flavor	Milky	4.25 ± 1.39	4.13 ± 1.73	5.75 ± 2.58
	Buttery	3.38 ± 2.26	2.88 ± 1.96	5.00 ± 2.83
	Grass/floral	2.75 ± 2.05	2.63 ± 2.33	4.00 ± 3.25
Taste	Savory	5.00 ± 2.62	3.25 ± 2.49	5.50 ± 2.67
	Sweetness	4.75 ± 2.31	4.25 ± 2.31	5.25 ± 3.11
	Saltiness	3.75 ± 2.19	3.38 ± 2.50	3.63 ± 2.26
	Creaminess	4.25 ± 2.38	4.13 ± 2.23	5.75 ± 2.66
Mouthfee	Fattiness*	3.75 ± 2.19^{a}	3.38 ± 2.67^{a}	5.88 ± 2.75^{b}
	Thickness*	3.63 ± 2.67^{a}	3.38 ± 2.56^{a}	5.75 ± 3.06^{b}
Aftertaste	Fatty aftertaste*	3.38 ± 1.92^{a}	3.25 ± 2.60^{a}	5.50 ± 2.78^{b}
Overall of Sensory characteristics		3,97 ± 2,06^{a}	4,39 ± 2,29^{a}	5,52 ± 2,54^{b}

*: There is a significant difference between samples at p-value<0.05, and different letter superscripts in the same line show significant differences at the level of p-value<0.05.

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CONCLUSION

Based on the result of QDA, the highest intensity value of sensory characteristics with high significance was in the sample of fresh milk treated with DKL-2 compared to the sample in DKL-1, as well as control, including yellowness, agglomeration, shininess, fatty appearance, fatty mouthfeel, and thickness. It is possible, fresh milk in cows consuming DKL-2 has a fairly high nutritional content of milk.

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