Curmiyeast as Supplement in PUFA- Concentrate for Modifying Production and Quality of Dairy Cow Milk in Bengkulu

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ABSTRACT

The objective of this research was to apply *curmiyeast* technology as feed supplement for modifying production and quality of dairy cow milk in farms in Selupu Rejang, Rejang Lebong, Bengkulu, Indonesia. There were six activities that had been conducted: preparation of temulawak (*Curcuma xanthorrhiza* Roxb) powder, *yeast* preparation (then as *Curmiyeast*), preparation of Concentrate-Polyunsaturated fatty acid (PUFA), PUFA-Concentrate application in dairy cows, milk production measurement and milk content analysis. Dry matter intake (DMI) of the ration (containing of 33 kg natural grass and 1 kg PUFA- concentrate) was 8.04 ± 0.48 kg/d. Milk production of pre treatment (no PUFA-concentrate) was 8.03 ± 2.68 kg/d, higher as much as 0.6 kg/d than it was before and post treatment. Milk fat was 4.61 ± 1.72 % and protein was 3.71 ± 0.86 %. Ratio of milk production to ration dry matter intake was 1.0; while ratio of milk production to PUFA-concentrate DMI was 0.67. It is concluded that *Curmiyeast* (1.5% curcuma and 1% yeast supplemented in PUFA-concentrate was able to modify milk production and milk quality of lactating dairy cow.

Key words: Curmiyeast, dairy cow, milk production, milk quality,

INTRODUCTION

Dairy cow farming center in Bengkulu is located in Selupu Rejang district, Bengkulu province. This area is laid on high land (900- 1400 m above sea level) with average temperatures around 18-26^{0}C. This is considered as ideal zone for dairy farms.

In general, farmers only provide the cows with natural grass, some *Pennisetum purpureum* and vegetables by-product; no concentrate was available. Diet (forage and concentrate) with the ratio either 35/65 or 65/35% was reported to improve milk production compared to control in dairy cows (Sulistyowati, 2000). Diet quantity will determine the amount of milk production, while, quality of diet affects nutrient contents of the milk. Dairy cows' milk contains more long chain fatty acid (LCFA); whereas dairy goat milk contains high short chain fatty acid (SCFA), and medium chain fatty acid (MCFA), according to Bouattour *et al*. (2008).

Feed supplement, *Curcuma xanthorrhiza* Roxb (containing curcumin and xanthorrizol) has some functions, such as antistaphilococcus (Rukayadi *et al.*, 2008); while, yeast (mostly containing *Saccharomyces cereviseae*) modifies microbial activities in rumen therefore it will improve ruminants' productivity (Yalçın *et al.*, 2011). *Curcuma* and yeast supplemented in Tabut block increased milk production of dairy cows (Sulistyowati and Erwanto, 2009). *Curmiyeast,* a mixture powder of *Curcuma* and yeast in PUFA-concentrate was effective in improving milk production and milk fatty acid quality in dairy goat (Sulistyowati *et al*., 2013), as well as *in vitro* goat fermentation (Sulistyowati *et al*., 2014).

Based on these results, an application of supplementation of Curmiyeast in PUFA-concentrate has been conducted in dairy cow farms in Selupu Rejang, Rejang Lebong, Bengkulu, Indonesia.

MATERIALS AND METHODS

Preparation of *Curmiyeast* (Curcuma dan Yeast)

Fresh curcuma tubers were washed, sliced thinly, dried, ground, then powdered. This curcuma powder contained 0.8% curcumin dan 1.58% tannin (Sulistyowati *et al.*, 2013), then supplemented as much as 20 g/d in PUFA- concentrate.

Yeast was prepared by modifying procedure of Pusbangtepa (1981). Ingredients used were rice flour, cassava, sugar, garlic, *Alpinia galanga*, lemon extract, water, and starter yeast. These components were all made as dough, fermented for 24 hours, mounted for 10g each, then sun dried. The yeast was supplemented as much as 20 g/d in PUFA- concentrate. This yeast contained $3.6\ 10^7$ cfu/g (Sulistyowati *et al*., 2013).

Preparation of PUFA-Concentrate

The PUFA- concentrate was modified (no cassava and different oil source as well as the compositition) from the formula of the previous result reported by (Sulistyowati *et al*., 2013), displayed in Table 1. Ground corn and soybean meal were roasted in 80^0C until turned light brown.

Table 1. Composition and nutrient contents of PUFA- concentrate and King grass

Ingredients	Composition (%)	
Rice brand	50	
Ground corn	25	
Soybean meal	20	
Palm oil	4	
Urea	0.5	
Mineral	0.5	
Yeast	1.0	
Curcuma	1.5	
Nutrients	PUFA-concentrate (%)	Grass (%)
Dry matter	90.41	21.75
Crude protein	14.37	8.75
Ether extract	13.29	1.43

Application of PUFA- concentrate supplemented with Curmiyeast in dairy cows

There were 10 lactating dairy cows in 2-4 months of lactation and the average milk production of 8.26 ± 1.76 kg/d before application of PUFA-concentrate.

The PUFA-concentrate was provided as much as 1 kg/cow/d. *Curmiyeast* (20g curcuma and 10g yeast) was spreaded on top of the concentrate. Forage, mainly natural grass, was provided as much as 33 kg/ cow/d in two servings, in the mornings and afternoons after milking. Time periods of the research were 7 days of no PUFA-concentrate, 21 days of PUFA-concentrate application, and 10 days of post application. Oarts were weighed each morning to determine ration consumption, nutrients, and dry matter intake. Milk production were recorded twice, in the morning and afternoon milkings. Data were tabulated and analyzed in descriptive manner.

RESULTS AND DISCUSSIONS

Milk Production and Milk Quality

Milk Production, ration consumption and milk – dry matter intake ratios during treatment of PUFA-concentrate supplemented with Curmiyeast is presented on Table 2. Data showed that there was an increase of milk production for 0.6 kg/d, followed by a decrease of milk production almost about the same amount (0.56 kg/d) post treatment (no PUFA-concentrate and *Curmiyeast*). This indicated that there was the same milk production before and post treatment, meaning that there was no increament unless the treatment was applied.

Table 2. Milk Production dry matter intake ratios during treatment of PUFA-concentrate with Curmiyeast in dairy cows

Variable	PUFA-concentrate
Milk production before treatment (kg/d) (A)	7.43 ± 2.71
Milk production during treatment (kg/d) (B)	8.03 ± 2.68
Milk production post treatment (kg/d) (C)	7.47 ± 2.15
Milk production increament (kg/d) (B-A)	0.60
Milk production difference (C-B)	-0.56
DMI of forage (kg/d)	7.14 ± 0.48
DMI of PUFA-concentrate (kg/d)	0.90
DMI of ration (kg/d)	8.04 ± 0.48
Ratio of milk/DMI ration	1.0
Ratio of milk increament/DMI PUFA-conc.	0.67

The average milk production in this research was considered lower (8.03 ± 2.68 kg/d) than that of dairy cow (8.34 kg/d) supplemented with Lactation Concentrate with the same amount (1kg/d) at the same farm (Sulistyowati *et al*., 2010). Ratio of milk production to DMI of ration was about efficient for 1 kg of DMI produced 1 kg of milk; while the ratio of milk increase to PUFA-concentrate is about 67%. If it is calculated, there was still some profit in return.

Milk quality of dairy cows fed with PUFA-concentrate supplemented with *Curmiyeast* is presented on Table 3.

Table 3. Milk quality of PUFA-concentrate with Curmiyeast in dairy cows

Variable	Amount
Milk fat (%)	4.61 ± 1.72
Milk fat production (kg/d)	0.35 ± 0.12
Milk protein (%)	3.71 ± 0.86
Milk protein production (kg/d)	0.28 ± 0.04

Milk fat (4.61%) of dairy cows treated with PUFA-concentrate supplemented with Curmiyeast (2% Curcuma and 1% yeast) in this research was considered higher compared to that of with PUFA-concentrate supplemented with 1.5% Curcuma and 0.5% yeast, that was in the average of 3,85% (Sulistyowati *et al*., 2010). It implied that the higher Curcuma and yeast supplemented in PUFA-concentrate will increase milk fat.

CONCLUSIONS

Based on the data, it can be concluded that feeding PUFA-concentrate for 1 kg/day supplemented with Curmiyeast (2% Curcuma and 1% yeast) in dairy cows increased milk production as much as 0.6 kg/day then decreased as much as 0.56 kg/day post treatment. Milk fat content was 4.61 ± 1.72 % and milk protein was 3.71 ± 0.86 %.

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