

# Teat End Condition at Different Lactation Periods

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## Abstract

Dairy cattle must be in good health condition as a producer of milk. This study was aimed to assess the influence of hand milking at difference lactation towards teat end condition and hyperkeratosis on dairy cattle in Kunak Bogor and Pasir Jambu Bandung. Object used in the study are clinical healthy dairy cattle in normal lactation and that were selected using the purposive sampling method. As many as 31 from Kunak Bogor and 56 from Pasir Jambu Bandung. Research method was conducted by observation to score teat end condition using Mein and Ohnstad method and the possibility of the occurrence of pathological changes, hyperkeratosis on teat. The analysis was done by descriptive approach and using Chi-Square test. The result showed that the change of teat surface condition and hyperkeratosis was influenced by lactation period. Hopefully, the result of this study could be used by farmer in order to improve milking management and prevent diseases caused by the poor condition of teat.

**Key words :** *Hyperkeratosis, teat end condition, teat scoring, dairy cows*

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## 1. INTRODUCTION

[1];[2] stated, milking activity that are not lege artis causes changes in teat end condition become rough and bad, thus forming keratin ring. [3] also stated that rough or erode teats histologically turn into hyperplasia in the stratum corneum, thus forming hyperkeratosis. According to [3], hyperkeratosis accompanied by several physiological and anatomical factors, such as parity, and udder anatomy may affect the reduction in milk production.

In Indonesia, observation towards teat end condition and hyperkeratosis on dairy cattle has not much been done and reported, therefore research needs to be conducted. West Java Province is one of the central dairy farm in Indonesia, with a population of 135 345 cattle and with milk production of 260 823 ton/litter [4] (KEMENTAN 2015), therefor the location of the research is focused in West Java. The aim of this study was to assess the impact of manual milking towardsteat end

condition and the incidence of hyperkeratosis based on parity of dairy cattle located in Kunak Bogor and Pasir Jambu, Ciwidey, Bandung, West Java. This study is expected to be a vehicle to sharpen skills in applying teat assessment methods and giving information to dairy farmers regarding the effects of parity towards teat end condition in dairy cattle. This information is also expected to be the basis of management improvement in milking dairy cattle in Indonesia.

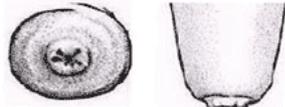
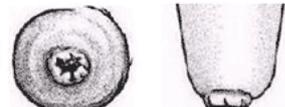
**2. METHOD**

**Research Design**

This research used purposive sampling method. With means by choosing farms with dairy cattle on normal lactation and clinically healthy. Normal lactation period of dairy cattle is first month until entering dry cow period at the seventh month of milk production. According to sampling results, 31 dairy cattle were obtain from Cibungbulang Sub-district Regional Dairy Farm Bogor and 56 dairy cattle from Pasir Jambu Subdistrict Regional Dairy Farm Bandung. Observation on research object refers to teat assessment method according to [1]; [5] as shown in Figure 1.

**Data Analysis**

Data obtain were analyzed descriptively using Microsoft Excel and further analyzed using Chi-Square test. Analysis results presented in table form.

Score	Description	Illustration
Score 1 (N)	<b>No Ring.</b> The teat-end is smooth with a small, even orifice. This is a typical status for many teats soon after the start of lactation.	
Score 2 (S)	<b>Smooth or Slightly Rough Ring.</b> A raised ring encircles the teat orifice. The surface of the ring is smooth or it may feel slightly rough but no fragments of old keratin are evident.	
Score 3 (R)	<b>Rough Ring.</b> A raised, roughened ring with isolated fragments of old keratin extending a short distance from the teat orifice.	
Score 4 (VR)	<b>Very Rough Ring.</b> A raised ring with rough fragments of old keratin extending out from the teat orifice. The rim of the ring is rough and may be cracked, often giving the teat-end a "flowered" appearance.	
Score 5	<b>Open Lesions or Scabs.</b>	<i>Not pictured.</i>

**FIGURE 1.** Teat end condition assessment method

**3. RESULT AND DISCUSSION**

**Teat End Condition**

From Table 1 it can be concluded the older the lactation periods, more changes on teat surface. For example, teat end condition from cow on first, second, and third lactation generally looks normal (No Ring). At fourth and fifth lactation, teat end have experienced minor changes in the

form of smooth or slightly rough keratin ring. On sixth lactation teat end experience major changes in the form of rough keratin ring. On seventh lactation experience major changes in the form of very rough keratin ring and some experience pathological change in the form of hyperkeratosis. This is presumably due to the increased frequency of milking. Results are similar to the research results of [3]; [6] which states that changes in teat end condition of dairy cattle in older lactation are worse than dairy cow in earlier lactation.

**Table 1** Percentage of teat end condition and hyperkeratosis incidence by lactation period

Lactation	(n) cow	(n) teat	Teat end condition				
			Normal (%)	Smooth/ slightly rough (%)	Rough (%)	Very rough (%)	Hyperkeratosis (%)
1	9	36	<b>66.7</b>	25.0	8.3	0	5.6
2	17	68	<b>60.3</b>	30.9	8.8	0	7.4
3	23	92	<b>57.6</b>	31.5	10.9	0	14.1
4	20	80	40	<b>45</b>	15	0	21.3
5	10	40	30	<b>47.5</b>	17.5	5	32.5
6	4	16	25	<b>37.5</b>	<b>25</b>	<b>12.5</b>	50
7	4	16	25	31.3	<b>18.7</b>	<b>25</b>	62.5

Associated with [7] theory which stated that cattle are said to be in a problem if more than 20% of cattle have teat end with rough keratin ring or more than 10% with very rough keratin ring, therefor by looking at Table 1 it can be said that dairy cattle at sixth and seventh lactation faces problems.

### ***Effect of Lactation Age Towards Teat Surface***

As we know that on every lactation age changes in milk production occurs. With that in consideration [8] divided lactation period as follows: first lactation until the second is referred to the early production period, third lactation until the fifth is referred to the peak production period and sixth lactation until the seventh is referred to the end of production. The grouping is implemented in Table 2.

According to Table 2 it can be learned that normal teat end condition at early production (62.5%) is greater compared to lactation at its peak production age (45.8%) and lactation at the end production (21.9%). Smooth/slightly rough teat end condition at peak production (39.6%) is greater compared to lactation at early production (28.8%) and lactation at end production (34.4%). Rough teat end condition at end production (28.1%) is greater compared to early production (8.7%) and peak production (13.7%). In condition of very rough teat surface at end production (15.6%) is greater compared to early production (0%) and peak production (9%). Statistical test results of data obtained indicate a probability value of **0000 (<0.05)**, which means that there is an effect between the ages of lactation towards teat end condition.

**Table 2.** The effect of lactation period towards teat end condition

Lactation	Teat end Condition								Total	pV	
	Normal		Smooth/slightly rough		Rough		Very rough				
	(n) teat	%	(n) teat	%	(n) teat	%	(n) teat	%			
Early production	65	62.5 %	30	28.8 %	9	8.7 %	0	0%	104	100 %	0.000*
Peak production	97	45.8 %	84	39.6 %	29	13.7 %	2	9%	212	100 %	
End production	7	21.9 %	11	34.4 %	9	28.1 %	5	15.6 %	32	100 %	
Total	169	48.6 %	125	35.9 %	47	13.5 %	7	2%	348	100 %	

\*shows there is visible effect on pV(<0.05)

**Milking Management**

From Table 1 and Table 2 once again can be concluded that lactation period effects change in teat condition and incidence of hyperkeratosis. Teat end condition that experience this change is thought to be the course of the milking process. The higher the milking frequency in parallel with lactation period, the more damage of teat end occurs. The more damage on the teats end, the more keratin ring forms as a respond to healing of the tissue. However, this process also affects the flexibility of the teat as so it invites new problems such as broken teat surface which then becomes an entry port for pathogenic bacteria [9]; [10].

Apart from milking management factor, the process of hyperkeratosis according to [5] is effected by weather, climatic conditions, environment, milk production, lactation age, parity and genetic. [3] added that other than those factors above, hyperkeratosis is also effected by over use of disinfectant which results in skin irritation of the teat, teat become rough, chapped, dry, wounded, and easily infected by bacteria such as *Staphylococcus aureus*. The impact of it all causes difficulty in healing of the dairy cow teats.

Factors that cause hyperkeratosis as mentioned by [5] are also proven in this study. This is partly shown with the presence of the dry season as an influence factor towards weather in causing lack of water supply and bad cattled environment sanitation so that dairy cow teat are easily susceptible to infectious pathogens.



**Figure 2.** Milking is done traditionally by an Indonesian dairy farmer

[5]; [11], who stated that traditional milking using two fingers (Strip Method) will affect the anatomical shape of the udder and teat. Two finger milking (Strip Method) is milking with the thumb and forefinger by shifting from the base of the teat downwards while massaging, loosened then press upward. This two finger milking method can inflict various problems, including occurrence of subclinical mastitis if used continuously until the cow reached old age. Weakness in

milking this way is that the udder and teats are always wet, easily wounded and the teats anatomy will slowly become longer. Long teats will easily develop subclinical mastitis compared to shorter teats therefore teat length can be used as a predisposing factor of subclinical mastitis [12]. Milking with this method is applied at Kunak dairy farm Cibungbulang Bogor and Pasir Jambu Ciwidey Bandung, West Java.

Other than milking, age factor also affects the occurrence of subclinical mastitis. [13] study about the factors that cause mastitis showed that age positively associates to the occurrence of subclinical mastitis, meaning subclinical mastitis often affects cattle of old age. The older the age of the cattle, especially cattle with high milk production, the more loosely the teat sphincter, making it easier to become infected because the ability of the sphincter to resist the entry of germs is reduced. The higher the milk production, the longer the time needed for the sphincter to close properly [14].

#### 4. CONCLUSION

The results showed that lactation period has a significant affect towards changes in teat end condition and hyperkeratosis.

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