Relationship of Lactation Period Between Colostrum Production and Colostrum Fat on Friesian Holstein Crossbred

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Abstract. The aim of this study was to determine relationship of lactation period with colostrum production and colostrum fat in Friesian Holstein crossbred in rural area of KPSP Setia Kawan, Nongkojajar, Pasuruan. A total of 37 dairy cow pasca partus consisting of different lactation period (1–4) were observed directly with case study method and analyzed using regression and correlation. The results showed that the colostrum production regression equation was $Y = 5{,}286 + 0.432X$ and $R^2 = 0.613$ and the colostrum fat regression equation was $Y = 7{,}090–0.323X$ and $R^2 = 0.255$. The average production of colostrum dairy cows is highest in the fourth lactation (6.92 ± 0.30 L/cows/day) and colostrum fat is highest in the first lactation (6.68 ± 0.79 L/cows/day). The lactation period significantly affected colostrum production and fat.

Keywords: lactation period · colostrum production · colostrum fat · dairy cattle

1 Introduction

Dairy cows are the cattle who raised specifically to produce milk. One of the most popular types of dairy cattle in the world such as the Frisien Holstein dairy cow, but the Frisien Holstein dairy cow that has been crossed with a local cow is called a Peranakan Frisien Holstein (PFH). PFH has capability to adapt easily in the tropical climate in Indonesia and have inherited traits from their parents in the form of a fairly high body weight [1]. The average milk production of PFH cows are only able to reach 8.92 litters/day [2]. The lactation period is the period when cows have calved and produce milk. The lactation period of dairy cows affects milk production and milk quality. Milk production of per lactation dairy cows will continue to increase until the 4th lactation period, if the dairy cow at the age of 2 years has given birth (first lactation) and after that there is a decrease in milk production. Colostrum is first secreted by the mammary glands after the mother gives birth. Colostrum is the best feed source for calves consisting of carbohydrates, proteins, fats and other nutrients and contains immunoglobulins, antimicrobial proteins, growth factors [3]. The factors of that affect colostrum production and parity colostrum

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content, age of calving, season, time of birth and milking [4]. The present was conducted to determine the relationship of lactation period with colostrum production and colostrum fat of crossbred friesien holstein.

2 Materials and Methods

2.1 Data Collection

The research was conducted in KPSP Setia Kawan Nongkojajar area, Pasuruan Regency. The materials used in this study were 37 dairy cows Frisien holstein crossbred old pregnant before parturition which have criteria on lactation period 1 to 4. The research method used the case study method. The research sample was taken by purposive sampling. Colostrum production was calculated from cow parturition milking day 1–7. Measurement of the amount of colostrum production using standard measuring a cup 1 litter. Determination of colostrum fat using lactoscan milk analyzer [2].

2.2 Statictical Analysis

The data were analyzed using simple linier regression equation with program statistic product and solution service (SPSS) version 22, to test the effect of each independent variable (lactation period) on the dependent variable (colostrum production and colostrum fat).

3 Results and Discussion

3.1 Relationship of Lactation Period Between Colostrum Production

The average yield of colostrum production in PFH dairy cows with different lactation periods in a row, namely the first lactation period showed 5.77 $\pm$ 0.39 litters/head/day, the second lactation period around 5.91 $\pm$ 0.38 litters/head/day, and the third lactation period around 6.876 $\pm$ 0.36 litters/head/day and the fourth lactation period around 6.92 $\pm$ 0.30 litters/head/day (Table 1). The production of colostrum in the first period of dairy cows showed lower yields than the second to fourth period. According to [4] that the first lactation period came from young cows/heifers that had low colostrum yields ($p < 0.05$). Dairy cows in the first lactation period came from heifers that were producing milk for the first time so, the number of secretory cells in the udder glands had not developed optimally yet. Meanwhile, dairy cows with a second to fourth lactation period experienced an increase in colostrum production because they had given birth and produced milk repeatedly so that the secretory cells in the udder glands had experienced increased growth and development. Damayanti [5] added that dairy cows with large udder volumes will increase their milk production… The results of this research showed that colostrum production was significantly affected by the lactation period ($P < 0.05$). The same results also were obtained by [6]. The regression equation for the lactation period and colostrum production was $Y = 5.286 + 0.432X$ ($R^2 = 0.613$) meaning that 61.3% of colostrum production was influenced by the lactation period while 38.7% was influenced

Table 1. Average colostrum Production and Fat based on Lactation Period

Lactation Period	Number of cows	Colostrum Production (liters/head/day)	Colostrum Fat (%)
1	11	5.77 ± 0.39	6.68 ± 0.79
2	8	5.91 ± 0.38	6.56 ± 0.66
3	11	6.76 ± 0.36	6.21 ± 0.55
4	7	6.92 ± 0.30	5.66 ± 0.44
Total	37		

by other factors. According to [4] other factors that affect colostrum production are age at calving, during a long dry period ≤ 45 days cows produce less colostrum, spring and summer a cow produces more colostrum, body condition score. (BCS) > 3.5 significantly resulted in less colostrum production, the time lapse between colostrum milking and giving birth 6 h significantly resulted in more colostrum production. Added [7] colostrum production is also influenced by pedigree and characteristics of calves.

3.2 Relationship of Lactation Period Between Colostrum Fat

The average results of colostrum fat content in the first to fourth periods were 6.68 ± 0.79, 6.56 ± 0.66, 6.21 ± 0.55, 5.66 ± 0.44 (Table 1). The fat content in this research was measured and obtained a significant result ($P < 0.05$) that the highest fat content was obtained from cows during the first lactation period than cows from other periods. This correspond to the research of [4] that the first lactation period cow has a higher colostrum fat content than the larger lactation period cow. In this research, the average fat content of colostrum was the same as that of [8] which stated that the average fat content was around 6–7%. The regression equation for the lactation period and colostrum fat content is $Y = 7.090 - 0.323X$ ($R^2 = 0.255$) meaning that 25.5% of the lactation period factors affect colostrum fat content, while the remaining 74.5% is influenced by other factors. Other factors that influence colostrum fat content were the age at calving, cows that are calved in the summer and autumn had the lowest colostrum fat content, the time interval between calving and milking ($P < 0.05$) and the length of dry period ≥ 85 days resulted in higher fat of colostrum [4].

4 Conclusions

It could be concluded that the best colostrum production was in the fourth lactation period and colostrum fat was in the first lactation period. The lactation period had a significant effect ($P < 0.05$) on colostrum production and colostrum fat.

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