International Journal of Multidisciplinary and Current Educational Research (IJMCER)
ISSN: 2581-7027 ||Volume|| 5 ||Issue|| 6 ||Pages 149-153 ||2023||

# Effect Of Fresh Milk Feeding Volume On Bull Jersey Calves On Pre-Weaning Production Performance

[1,]Muhammad Arif Fadilah, [2,]Hermanto, [3,]Puguh Surjowardojo,
[1,2,3,]*Postgraduate Student, Faculty of Animal Science, University of Brawijaya Malang 65145, Indonesia*
*Lecture of Faculty of Animal Science, University of Brawijaya Malang 65145, Indonesia*

**ABSTRACT :** The study aimed to evaluate the effect of different volumes of fresh milk on the production performance of Jersey bulls calves at pre-weaning time. The method used is an experimental method using t-Test: Two-Sample with 2 treatments and 15 repetitions of 30 calves selected based ageed (1-2 days) with an average initial weight of 29.76 ± 3.29 Kg, calves are distributed to 3 farmer in 1 region and maintained for 60 days. The treatment is as follows: P1 = Fresh milk 3 litters and P2 = Fresh milk 4 litters. The variables measured include include average daily gain (ADG) Total intake Calf Starter (CS), Total intake Tumpi, Feed Conversion Ratio (FCR) and Income Offer Feed Cost (IOFCThe results showed different treatment (P<0.01) ADG, IOFC, Intake CS, Intake Tumpi, significantly different (P<0.05) FCR The conclusion of this study is that P2 treatment showed the best results against ADG (0.447 ± 0.05 Kg / day), FCR (12.443 ± 2.475 Kg), IOFC Rp 720,070,529 ± 134,956.60), Intake CS (0.366 ± 0.058 Kg/Body weight/DM) and Intake Tumpi (0.025 ± 0.004 Kg/Body weight/DM)) in fresh milk 4 liters lower than 3 litters.

**KEYWORDS** - Jersey bulls calves, production performance

## I. INTRODUCTION

The limitation of beef calf causes of the lack of beef production in Indonesia. The Jersey bull calves as an alternative in an effort to meet the needs of beef calf by maximizing production performance during pre-weaning. Kiezebrink et al. (1) reported calves given milk of 4 L/day and 8 L/day had a markedly different ADG where calves given milk of 4L/day had an average ADG of 0.62 kg/day, while calves given milk of 8 L/day had 0.78 kg/day during the period from birth to weaning. Chapman *et al.*, (2) reported that MR administration programs of more than 0.7 Kg DM/day decreased CS consumption and increased ADG at the time before weaning. The effect of giving MR 0.7 Kg DM / day in post-weaning showed suboptimal growth both in ADG, morphometric growth in calves aged two months. This implies a balance between the amount of milk fed and CS consumed to maximize growth potential during the neonatal period and to facilitate the transition of feed from liquid to solid to weaning (3). Intensive use of MR in calves in early life increases ADG, accelerates weaning and has a positive effect on productive performance later in life Hammon et al., (4). Liquid feed affecting in calf performance growth, so it is necessary to evaluate the volume of fresh milk as a substitute milk for the growth of Jersey bull calves production performance

## II. MATERIALS AND METHOD

**Location and time** : This study was conducted from October 9 to December 28, 2021 in Dairy Farmers Jl Maduarjo Babaan village, Ngajum District, Malang, East Java.

**Materials** : The material used is Jersey bull calves as many as 30 heads, aged 1 day, with an initial weight of 29.76 ± 3.29 Kg from PT. Green Field Indonesia. The fresh milk used is PFH milk from farmers, The Calf Starter and Tumpi From CV. Sinar Mentari Blitar, East Java, Indonesia

**Methods :** The treatment is as follows: P1 = Fresh milk 3 litters and P2 = Fresh milk 4 litters. The variables measured include average daily gain (ADG) Total intake Calf Starter (CS), Total intake Tumpi**,** Feed Conversion Ratio (FCR**)** and Income Offer Feed Cost (IOFC**)**

**Statistical analysis :** The data obtained in the study were tabulated and analyzed descriptively to determine the effect of differences in the volume of fresh milk on the performance of Jersey cow calves analyzed with *an Independent T-Test* using Microsoft Excel. The homogeneity test is used to determine the t test *using T-Test Two-Sample Assuming Equal Variances (assumed homogeneous data) and if different variants using* T-Test Two-Sample Assuming Unequal Variances

Tabel 1. Analysis Lactoscane Milk Replacement

| **Kode** | **F** | **D** | **L** | **SnF** | **P** | **W** | **T** | **Fp** | **s** | **TS** |
|---|---|---|---|---|---|---|---|---|---|---|
| Tri (A) | 4,25 | 23,70 | 3,68 | 6,97 | 2,68 | 16,53 | 19,40 | -0,434 | 0,66 | 11,27 |
| Pongky (B) | 4,34 | 23,63 | 3,67 | 6,96 | 2,59 | 16,53 | 20,50 | -0,434 | 0,66 | 11,26 |
| Eko (C) | 4,19 | 22,66 | 3,52 | 6,68 | 2,49 | 20,38 | 19,70 | -0,414 | 0,64 | 10,84 |

Keterangan:
F: Fat (%),D: Density (gr/cm$^3$), L: Lactose (%),SNF: Solid Non Fat (%),P: Protein (%),T: Temperature ($^o$C), W: Water (%),s: Salt (%),FP: Freeze Point ($^o$C), TS: Total Solid (%)

Tabel 2. The Result of Proximat Analysis

| No | Feed | Feed Chemical Compostion | | | | | |
|---|---|---|---|---|---|---|---|
| | | DM (%) | ABU (%) | CP (%) | CF(%) | LK(%) | TDN(%) |
| 1 | Tumpi Corn | 87,45 | 14,72 | 11,56 | 21,30 | 2,92 | 54,22 |
| 2 | Calf Starter | 87,69 | 5,20 | 29,87 | 6,72 | 4,18 | 86,59 |

## III RESULTS

**Avarage Daily Gain :** Based on statistical analysis, it shows that treatment of fresh milk volume feeding had a very significant effect (P<0.01) on ADG at the age of 14-21, 21-28, 35-43, 43-53 1-60 (days).

Table 3. The Effect of different fresh milk on ADG pre weaning calf

| Age | Treatments | |
|---|---|---|
| | 3 Litter | 4 litter |
| Day | Kg/Day | Kg/Day |
| 1-7 | 0,203 ± 0,07 | 0,214 ± 0,07 |
| 7-14 | 0,164 ± 0,06 | 0,209 ± 0,08 |
| 14-21 | 0,187 ± 0,07** | 0,273 ± 0,07** |
| 21-28 | 0,149 ± 0,15** | 0,315 ± 0,16** |
| 28-35 | 0,321 ± 0,25 | 0,458 ± 0,21 |
| 35-43 | 0,563 ± 0,21* | 0,698 ± 0,13* |
| 43-53 | 0,450 ± 0,17* | 0,558 ± 0,11* |
| 53-60 | 0,446 ± 0,26 | 0,583 ± 0,26 |
| 1-60 | 0,353 ± 0,07** | 0,447 ± 0,05** |

* Superscrip yang berbeda dalam baris menunjukan adanya perbedaan sangat nyata (P<0,01)
*Superscrip yang berbeda dalam baris menunjukan adanya perbedaan sangat nyata (P<0,05)

**Intake Calf Starter and Intake Tumpi.** Intake Calf Starter Based on statistical analysis, it shows that Fresh milk volume feeding treatment has a very significant effect (P<0.01) on ADG at the age of 14-21, 43-53 1-60 (days). Intake Tumpi Based on statistical analysis, it shows that the treatment of fresh milk volume feeding has a very significant effect (P<0.01) on ADG at the age of 14-21, 43-53 1-60 (days).

Table 4. The Effect of different fresh milk on Calf Starter dan Tumpi

| Age | Calf Starter | | Tump Corn | |
|---|---|---|---|---|
| | Treatments | | Treatments | |
| Day | 3 Litter | 4 litter | 3 Litter | 4 litter |
| | DM/g/ Kg body weight | G/Kg body weight | DM/g/ Kg body weight | G/Kg body weight |
| 1-7 | - | - | - | - |
| 7-14 | - | - | - | - |
| 14-21 | 26,80 ± 5,71** | 17,23 ± 9,33** | 0,873 ± 0,21** | 0,536 ± 0,26** |
| 21-28 | 26,72 ± 9,21 | 25,83 ± 7,65 | 0,916 ± 0,36 | 0,889 ± 0,27 |
| 28-35 | 37,21 ± 17,93 | 35,40 ± 11,37 | 1,559 ± 0,78 | 1,556 ± 0,51 |
| 35-43 | 77,81 ± 24,09 | 68,51 ± 20,24 | 4,650 ± 1,43 | 4,023 ± 1,21 |
| 43-53 | 152,92 ± 42,00** | 120,33 ± 33,28** | 11,688 ± 3,23** | 9,348 ± 2,51** |
| 53-60 | 126,35 ± 48,15 | 98,92 ± 36,84 | 11,340 ± 4,38 | 9,021 ± 3,27 |
| 1-60 | 447,80 ± 115,54** | 366,22 ± 58,81** | 31,025 ± 8,56 | 25,372 ± 4,98** |

ferent superscripts on the same column show a very significant difference (P<0,01)
*Different superscripts on the same column has significant difference (P (P<0,05)

**Feded Convertion Rate :** Based on statistical analysis, it shows that the treatment of fresh milk volume feeding has a very real effect (P<0.01) on FCR at the age of 21-28 (days), a real effect (P<0.05) at the age of 1-60 (days)

Table 1. The Effect of different fresh milk on FCR

| Age | Treatments | |
|---|---|---|
| | 3 Litter | 4 litter |
| Day | Kg | Kg |
| 1-7 | 12,754 ± 8,297 | 11,285 ± 8,209 |
| 7-14 | 18,577 ± 7,519 | 14,778 ± 4,719 |
| 14-21 | 19,894 ± 11,199 | 14,785 ± 4,242 |
| 21-28 | 25,037 ± 15,848** | 13,430 ± 3,339** |
| 28-35 | 16,730 ± 15,498 | 9,541 ± 3,339 |
| 35-43 | 6,878 ± 2,437 | 6,440 ± 1,556 |
| 43-53 | 6,529 ± 2,272 | 7,438 ±2,195 |
| 53-60 | 9,081 ± 10,482 | 7,775 ± 5,472 |
| 1-60 | 16,838 ± 7,948* | 12,443 ± 2,475* |

)ifferent superscripts on the same column show a very significant difference (P<0,01)
*Different superscripts on the same column has significant difference (P (P<0,05)

**Income Offer Feed Cost (IOFC):** Based on statistical analysis, it shows that the treatment of fresh milk volume feeding has a very signification effect (P<0.01) on IOFC at the age of 1-60 (days)

Table 2.The Effect of different fresh milk on IOFC

| Variabel | Threatments | |
|---|---|---|
| | 3 Litter Milk | 4 Liter Milk |
| | Rupiah | Rupiah |
| IOFC | 474.995,451 ± 254.251,51** | 720.070,529 ± 134.956,60** |

)ifferent superscripts on the same column show a very significant difference (P<0,01)
*Different superscripts on the same column has significant difference (P (P<0,05)

## IV. DISCUSSION

**Avarage Daily Gain :** The results of statistical tests show the effect of differences in milk volume has a very significant effect (P<0.01) on ADG at the age of 1-60 days This is due to the higher consumption of nutrients obtained by calves so as to increase the chances of increasing digestibility and absorption of nutrients that affect the increase in ADG. Smith *et al.*, (5) found that increased nutrient intake sufficient to optimize growth performance was associated with increased plasma IGF-I concentrations, insulin, and glucose. Calves utilize nutrients to maintain body functions, excess nutrients are utilized for tissue and CFeletal growth of the body (6) The results of statistical tests show the effect of differences in milk volume on ADG at the age of 14-21 and 21-28 days is significantly different (P < 0.01), this is due to the consumption and digestibility of 4 litter milk giving higher so that it causes greater ADG growth than calves given 3 litter milk. The decrease in ADG occurs during the castration and weaning process. The results of static tests showed the effect of differences in milk volume on ADG during castration was significantly different (P<0.05). Castration gives side effects in the form of illness that can interfere with calf performance, giving higher fresh milk may be able to increase the healing process so that it can convert nutrients into higher ADG. Chapman *et al.,* (2016) stated that consumption of higher milk volumes improves health and growth. Khan *et al.,* (7) reported calves that obtained higher milk volumes had higher IgG and IgA. Nutrition can greatly affect immune function and may increase the susceptibility of calves in the neonatal phase to infectious diseases (8). Nutrition is an important determinant of the immune response, with protein and energy supply influencing cell-mediated immunity, cytokine production, complement system, phagocytic function, and secretory IgA antibody concentrations (9). The weaning process in calves causes a

decrease in ADG, calves fed fresh milk 4 litters have ADG 0.583 ± 0.26 kg / day higher than calves given fresh milk 3 litters 0.583 ± 0.26 kg / day. The decrease in ADG was due to a decrease in total consumption, where the largest contributor to consumption was obtained from fresh milk. Increased consumption of CS and corn mash has not compensated for nutrient losses caused by reduced fresh milk feeding. Bittar *et al*., (10) said the increase in CS consumption was not enough to compensate for the decrease in milk consumption, so that lower energy intake caused when weaning began calves had lower ADG and increased stress. Eckret *et al.,* (11) reported a decrease in ME consumption at the time of weaning resulted in a decrease in ADG.

**Consumption Calf Starter (CS) dan Consumption Tumpi Corn :** The results of the static test showed the effect of differences in milk volume on CS consumption at the age of 1-60 days was significantly different (P<0.01) This is linear with previous studies where higher MR consumption volume has lower CS consumption than conventional MR consumption. Morrison *et al.* (3), stated that low CS consumption in calves that consume higher milk volumes implies a balance between the amount of MR and CS consumed to maximize growth potential and feed transition during the pre-weaning process. The results of statistical tests showed the effect of differences in milk volume on CS consumption at the age of 14-21 days was significantly different (P<0.01). The difference in calf starter consumption at the age of 14-21 days is due to the lower amount of nutrients consumed from fresh milk 3 liiters, so efforts to compensate for nutritional needs by increasing calf starter consumption. NRC (6) states The most critical period in calves is the first 2-3 weeks of life, during which time the calf's digestive system is not optimal but develops rapidly with regard to digestive secretion and enzymatic activity. This period is the initial phase of calves to digest vegetable protein, starch, cellulose, hemicellulose, and synthesize vitamins B-complex and K, but in this phase calves still need a source of liquid nutrients that are very easy to digest until the rumen develops optimally and efficiently digests fiber, starch, cellulose, and hemicellulose. The results of statistical tests showed the effect of differences in milk volume on CS consumption at the age of 43-53 days was significantly different (P<0.01). The treatment of giving 3 litter milk has a higher CS consumption due to efforts to meet the nutritional needs of calves and it is suspected that the development of the rumen of giving fresh milk 3 litters is better than giving fresh milk 4 litters. Enriquez *et al.,* (11) said one of the factors causing strees in the weaning process of calves is the loss of nutritional sources from milk. Weaning stress can be evaluated by behavioral changes, such as vocalization frequency and motor activity (12).The decrease in CS consumption in the weaning phase of the process may be due to stress at the time of reduction in the amount of milk given. Decrease in CS consumption in fresh milk treatment 3 litters by 30.57 g / Kg body weight) and 21.41 (g / Kg body weight) in fresh milk treatment 4 litters .

The results of statistical tests show the effect of differences in milk volume on the consumption of Corn Tumpi at the age of 14-60 and 14-21 days different real ability (P<0.01) days different real ability (P<0.01). The difference in Tumpi consumption at the age of 1-60 and 14-21 days is due to the lower amount of nutrients consumed from fresh milk 3 liiters, so that efforts to compensate for nutritional needs by increasing corn tumpi consumption, because in this phase calves still need a source of liquid nutrients that are very easy to digest until the rumen develops and is efficient in digesting fiber, starch, cellulose, and hemicellulose (6). Giving tumpi as a source of fiber aims to stimulate the growth of rumen, texture and shape of tumpi that is smooth and bulky is expected not to inhibit the consumption of calf starter. Hill *et al.,* (13) reported the addition of forage in calf feed limits calf starter consumption which decreases calf growth at 28-56 days of age. Iman et al., (2017) reported that the level of CS consumption is higher in *free choise* than the Total Mixed Ratio (TMR), this is influenced by the amount of forage used in TMR. Free choise corn tumpi may imply a balance of nutrients or fiber requirements as a stimulator of rumen growth.

**Feed Convertion Ratio :** The results of statistical tests show that the effect of differences in milk volume on FCR at the age of 1-60 days is not significantly different (P < 0.05) iskandar and Elfriadah (14) said that the smaller the feed conversion value means a better level of feed utilization efficiency, on the other hand, if the feed conversion is large, the level of feed utilization efficiency is not good. Hill *et al.,* (13) reported calves that obtained higher MR had higher feed efficiency than conventional MR at the age of 1-56 days. Chanpman *et al.,* (2) added that the higher the quality and quantity of MR given has a higher feed efficiency value (P<0.01). The results of statistical tests show that the effect of differences in milk volume on FCR growth at the age of 21-28 days is very different (P<0.01). This is because the ADG of giving milk is 4 liiter higher than 3 liiter, where in this period the function of the calf's rumen has not been optimal so that it is not able to convert feed (CS and tumpi) to cover the lack of nutrients in obtaining the same ADG growth as calves given 4 liiter milk. Berends *et al.,* (2020) reported calves that obtained lower DM consumption with the same ADG level had better FCR values. Khouri & F. S. Pickering (16) stated that the high FCR encountered during the initial four weeks may be

due to calf conditions that are susceptible to disease, especially diarrhea which can cause reduced digestibility of feed and dehydration of body tissues. Higher milk consumption also resulted in increased feed conversion efficiency during the pre-weaning period (17), calves use available nutrients to maintain vital bodily functions and only nutrients that exceed what is necessary for maintenance can be used to benefit tissue and fetal growth (6).

**Income Offer Feed Cost (IOFC) :** The results of static tests showed that the effect of differences in milk volume on IOFC at the age of 1-60 days was very different (P<0.01). The average IOFC treatment for 4 litters of fresh milk was 720,070,529 ± 134,956.60 (Rp) lower than the treatment of 3 litters of 474,995,451 ± 254,251.51 (kg/body weight). The average feed cost of giving fresh milk 4 litters is higher than 3 litters 1,351,296 vs 1,115,629 (Rp) and the Average Income from Body Weight Growth of 4 litters of fresh milk is higher than that of 3 litters 709,536 vs 510,829 (Rp), higher income due to Body Weight Growth of 4 litters of fresh milk is higher than 3 litters 26.79 vs 21.20 (kg). The IOFC value is a parameter of profit, the higher the IOFC value, the higher the profit. The ratio values in this study were 1.9: 1 and 2.2: 1. Soetanto (18) said the ratio between the price of product prices and feed prices can be used as a benchmark. Generally, the ratio between the price of the product (for example live weight) and the price of feed is at least 2: 1 in order to obtain adequate economic benefits.

## V. CONCLUSIONS

The conclusion of this study is that P2 treatment showed the best results against ADG (0.447 ± 0.05 Kg / day), FCR (12.443 ± 2.475 Kg), IOFC Rp 720,070,529 ± 134,956.60) and Intake CS (0.366 ± 0.058 Kg/Body weight/DM), Intake Tumpi (0.025 ± 0.004 Kg/Body weight/DM) and Total Intake CF (0.028 ± 0.004 Kg/Body weight/DM) in fresh milk 4 liters lower than 3 litters

## REFERENCES


1. Kiezebrink, D. J., A. M. Edwards, T. C. Wright, J. P. Cant, and V. R. Osborne. 2015. J. Dairy Sci. 98:349–356. https://doi.org/10.3168/jds.2014-7959.
2. Chapman, C. E., P. S. Erickson, J. D. Quigley, T. M. Hill, H. G. Bateman II, F. X. Suarez-Mena, and R. L. Schlotterbeck. 2016. J. Dairy Sci. In press.
3. Morrison, S. J., H. C. F. Wicks, A. F. Carson, R. J. Fallon, H. Twigge, D. J. Kilpatrick, and S. Watson. 2012.. Animal 6:909–919.
4. Hammon, H.M.,W.Liermann, D.Frieten and C.Koch.2020. Animal Volume 14, Supplement 1, 2020, Pages s133-s143
5. Smith, J. M., M. E. Van Amburgh, M. C. Diaz, M. C. Lucy, and D. E. Bauman. 2002. J. Anim. Sci. 80:1528–1537.
6. National Research Council. 2001. DC: National Academy Press
7. Khan, M.A., Lee, H.J., Lee, W.S., Kim, H.S., Kim, S.B., Ki, K.S., Ha, J.K., Lee, H.G., and Choi, Y.J., 2007 J. Dairy Sci. 90, 876–885.
8. Nonnecke, B. J., K. Kimura, J. P. Goff, J. Marcus, and E. Kehrli. 2003. J. Dairy Sci. 86:2359–2368.
9. Woodward, B. (1998) Nutr. Rev.56, S84–S92.
10. Bittar, C. M. M., M. P. Gallo, J. T. Silva, M. R. de Paula, M. Poczynek, and G. B. Mourão. 2020. J. Dairy Sci. 103:4672–4680 https://doi.org/10.3168/jds.2019-17614
11. Enríquez. d, M. J Hötzel And R.Ungerfeld. 2011. Acta Vet Scand. 2011 May 13;53(1):28. doi: 10.1186/1751-0147-53-28.
12. Veissier. I,S.Caré and D. Pomiès. 2013. Applied Animal Behaviour Science. Volume 147, Issues 1–2, July 2013, Pages 11-18
13. Hill, T. M., J. D. Quigley, F. X. Suarez-Mena, H. G. Bateman II, and R. L. Schlotterbeck. 2016. J. Dairy Sci. 99:6352–6361. https://doi.org/10.3168/ jds.2015-10812.
14. Iskandar. R dan Elrifadah. 2015. Volume 40 Nomor 1, Pebruari 2015 Halaman 18-24
15. Berends, H., H. van Laar, L.N. Leal, W.J.J. Gerrits, dan J. Martín-Tereso. 2020. J. Dairy Sci. 103:4275–4287 https://doi.org/10.3168/jds.2019-17382
16. KHOURI, R. H., PICKERING, F.S. 1968. N.Z. J. Agric. Res. 11: 227-236.
17. Diaz, M.C., M.E. Van Amburgh, J.M. Smith, J.M. Kelsey, dan E.L. Hutten.2001.. J. Dairy Sci. 84:830–842.
18. Soetanto, H., 2019. UB Press, ISBN 978-602-432-746-0