STUDY ON FATTENING DAIRY MALE CATTLE FOR MEAT PRODUCTION

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INTRODUCTION

Raising dairy male cattle for meat production plays an important role in livestock industry. This technique is interested in both developed and developing countries. In general, there is about 30% of the beef from dairy male calves meanwhile in Vietnam, this rate is very low because that almost the dairy male calves are sold in 1-2 weeks old.

Results of the previous studies showed that it is possible to use milk replacer to feed calves in period 1-3 months of age. Results also showed that after suckling period, dairy male calves can be raised on semi-grazing system with supplementation of available by-products in the area. Daily weight gain (DWG) of beeves can be reached an average of 500g/head/day, the same DWG of other crossbred beef cattle.

To continue the last period of the process, the aim of this study to determine energy density of fattening ration and duration of fattening.

MATERIAL AND METHODOLOGY

Animals

48 dairy bulls are in 13 and 15 months old (selected from the previous studies). The basal diet consisted of grass, beverage residue, cassava powder, molasses and concentrate. All ingredients have been mixed together in form of TMR (total mixed ration).

Experiment design

Two separated experiments for two groups of animals in 13 and 15 months of age. Each experiment was arranged by 2–factorial design (Table 2.1).

Table 2.1. Experiment design (for each group)

Energy density of rations (ME)	Fattening duration	
	2 months	3 months
High (2,500 Kcal/kg DM)	Sub.Group 1 (4 bulls)	Sub.Group 4 (4 bulls)
Medium (2,350 Kcal/kg DM)	Sub.Group 2 (4 bulls)	Sub.Group 5 (4 bulls)
Low (2,200 Kcal/kg DM)	Sub.Group 3 (4 bulls)	Sub.Group 6 (4 bulls)

(Crude protein was 120g/kg DM)

Raising techniques

- Rations: Total mix ration (TMR) offered ad libitum at the shed.

- Hygiene: Cattle shed have been cleaned every day. Animals have been dewormed intestinal parasites before fattening and injected FMD, Pateurelosis vaccine in accordance with the instructions of Veterinary Organization.

Monitoring indices

- Body weight: Bulls have been weighed individually 2 times per month with ruminant electronic scales.

- Feed intake: Quantity of TMR has been weighed individually every day.

- Components of meat (ratios of dissection and carcass) have been determined for all of bulls at slaughter-house. Thigh - meat samples from 48 bulls have been collected and analyzed nutritional values (water, fat, protein, and pH) by Vietnamese standards.

Statistical analysis

Data were analyzed by ANOVA using the General Linear Models in Minitab Statistical Software version 12.21 (Minitab 2000). Sources of variation were fattening energy of TMR and fattening duration.

RESULTS AND DISCUSSION

Daily weight gain (DWG)

Table 3.1. Daily weight gain (DWG) of bulls started fattening at 13 months of age (g/head/day)

Fattening duration	Energy levels			
	High	**Medium**	**Low**	**Mean**
2 months	1,058.4±147.9	999.3±227.2	633.7±76.8	**897.2^c±76.8**
3 months	825.8±63.3	765.2±77.9	686.0±71.3	**759.0^c±72.3**
Mean	**952.1^a±163.0**	**882.3^a±201.0**	**659.9^b±74.5**	**828.1±193.5**

Notes: - ME levels *fattening duration interaction : P = 0.054
*   - Means in the same row or column without common superscript are different at P<0.05*

Table 3.2. Daily weight gain of bulls started fattening at 15 months of age (g/head/day)

Fattening duration	Energy levels			
	High	**Medium**	**Low**	**Mean**
2 months	998.4±94.3	843.6±45.6	660.9±48.9	**834.3^e±48.9**
3 months	958.4±117.4	879.6±210.9	773.2±54.6	**870.4^e±54.6**
Mean	**978.4^{ab}±100.9**	**861.6^{bc}±142.6**	**717.0^{cd}±76.9**	**852.3±151.7**

Notes: - ME levels *fattening duration interaction: P = 0.412
*   - Means in the same row or column without common superscript are different at P<0.05*

The statistical results shown that there was not any interaction between the factors (energy levels and fattening duration) of experiments for DWG of the bulls started fattening at 13 and 15 months of age. For fattening duration, the results also showed that there was not any statistically significant difference (P>0,05) on DWG between treatments. However, fattening during 2 months gave a high average DWG than during 3 months. For the energy levels of TMR, there was a statistically significant difference (P<0,05) on DWG between treatments. For the group of bulls started fattening at 13 months of age, there was not difference (P<0,05) on DWG between high and medium ME levels however both of these groups had a DWG higher than the low level ME group (P<0,05). Meanwhile, for the group of bulls started fattening at 15 months of age, there was only a significant difference (P<0,05) on DWG between high and low levels ME groups (Table 3.1 and 3.2). When compared to other studies, results showed that DWG of dairy

fattening bulls was higher than local and some beef crossbreds such as Phu Yen yellow cattle: only 638g/head/day (Doan Duc Vu et al. 2010), Sindhi crossbred: only from 510-688g/head/day (Vu Van Noi, 1994), F_1 Brown Swiss: only 444-477g/head/day (Nguyen Van Thuong et al. 1995), F_1 Santa Gertrudis: only 522g/head/day (Nguyen Van Thuong et al. 1995). DWG of dairy fattening bulls was equivalence with DWG of F_1 Charolais and F_1 Simmental (Doan Duc Vu et al 2008): 713g/cow/day and 922g/head/day, F_1 Droughtmaster (Pham Van Quyen (2009): 911g/cow/day. However, DWG of pure Charolaise was higher than DWG of dairy bulls: 1,148g/cow/day (Pham Van Quyen (2009). Although it could be differed nutritional conditions in studies but results showed that DWG of dairy bulls was not lower than some other beef crossbreds existing in Vietnam. In general, fattening dairy bulls with high or medium energy levels during 2 or 3 months gave a suitable result on DWG. In other hand, there was not large difference on DWG between the starting ages of fattening 13 or 15 months.

Components and quality of beef

The dissection and carcass ratios of fattening bulls were 43.6-45.6% and 29.2 to 32.1% respectively. The dry matter, protein and pH of meat were 23.4-32.2%, 18.2-21.0% and 5.5-5.7 respectively. Data statistical analysis showed that there was not any interaction between factors of experiments as well as any differences between treatments on above mentioned indices (P>0.05). For fat content, results also showed that there was not any interaction between energy levels and fattening duration. It also showed that fattening during 2 or 3 months gave the same fat content of meat. However, there was a significant difference (P<0,05) on fat content between treatments of high, medium and low energy levels of TMR. Doan Duc Vu et al (2008) reported that ratios of dissection and carcass of Charolais and Simmetal crossbred were 52.3-55.1% and 35.6-36.5%, respectively. Research results of Dinh Van Tuyen et al (2007) showed that when carried out fattening Sindhi crossbred and Brahman breed in Tuyen Quang with 10. 91MJME/kgDM ration dissection was 42.02 and 38.53% respectively. Research results of Pham Van Quyen (2009) showed the dissection percentages of 50% Charolais, 50% Droughtmaster, 50% Brahman breeds and Sindhi crossbred were 53.13%, 50.76%, 49.07% and 46.78%; the carcass was 42.96%, 40.96%, 37.44% and 39.95% respectively. From above comparison, it could be recognized that, the proportions of dissection and carcass of dairy bulls after fattening had equivalency to the Sindhi crossbred and Brahman breed but lower than that of some beef cattle breeds such as Charolais, Droughtmaster. About the nutritional values of meat, there were not any differences on water and protein contents in comparison with other authors such as Pham Van Quyen (2009) on pure Charolais and Droughtmaster breeds, Doan Duc Vu et al (2008) on Charolais and Simmental crossbreds. In general, meat component and quality of fattening bulls have an average value compared to the other local beef breeds. Fattening with medium or high energy levels gave more inside-meat fat.

Table 3.3. Fat content in meat of fattening bulls at 13 months of age (%)

Fattening duration	Energy levels			
	High	Medium	Low	Mean
2 months	7.0±2.9	7.8±1.7	3.9±0.8	**6.2^c±2.5**
3 months	6.8±2.7	7.8±2.7	3.7±0.5	**6.1^c±2.7**
Mean	**6.9^a±2.5**	**7.8^a±2.1**	**3.8^b±0.6**	**6.2±2.5**

Notes: - ME levels *fattening duration interaction : P = 0.991
*   - Means in the same row or column without common superscript are different at P<0.05*

Table 3.4. Fat content in meat of fattening bulls at 15 months of age (%)

Fattening duration	Energy levels			
	High	Medium	Low	Mean
2 months	7.6±2.2	5.8±0.7	2.7±0.3	**5.4^c±2.4**
3 months	5.2±3.0	4.3±2.4	4.0±3.1	**4.5^c±2.6**
Mean	**6.4^a±2.7**	**5.1^a±1.8**	**3.4^b±2.2**	**4.9±2.5**

Notes: - ME levels *fattening duration interaction : P = 0.253
*   - Means in the same row or column without common superscript are different at P<0.05*

CONCLUSIONS

Fattening dairy bulls for meat production should be used medium energy level of TMR (about 2,350Kcal/KgDM). Duration of fattening could be 2 or 3 months and the starting age of fattening could be 13 or 15 months old depending on farming conditions.

REFERENCES

Dinh Van Tuyen (2007), *Compare the possibility of the growth and fattening for beef between pure Brahman and Sindhi crossbred at Tuyen Quang*. Annual Reports. National Institute Animal Husbandry, Hanoi.

Doan Duc Vu (2008), *Characteristic phenotype, growth, physiological and biochemical parameter of cattle bred for meat (25% and 75%) Charolais, Simmental breed in Ho Chi Minh City*, Annual reports, Institute of Agriculture science and technology for Southern, HCM City.

Doan Duc Vu, Phan Viet Thanh, Phạm Manh Hung, Vu Thi Minh Thu (2010). *Research development and selection of Phu Yen yellow cattle became the brand.* Final Reports of Science and Technique.

Pham Van Quyen (2009), *Study on ability production of pure Droughtmaster breed with 50% Droughtmaster breed in southeastern area*, Doctoral thesis.

Figure 1. Dairy male HF cattle

Figure 2. Fattening bulls at farm household

Figure 3. Fattening bulls

Figure 4. Feeding bulls

Figure 5. Fattening bulls at RRTC