



The Effects of Feeding Strategy and Housing Management on Intake and Growth Performance of Holstein Calves from Birth through Weaning

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INTRODUCTION

The main goal of dairy calf programs is to produce healthy animals that will develop into strong and productive lactating cows.

- Ad libitum feeding of calves in the milk feeding phase has been found to result in:
 - Greater average daily gain and improved feed efficiency
 - Reduced incidence of disease and behavioral signs of hunger
 - Improved herd performance, with a lower age at first breeding and higher milk yield in first lactation
- Group housing of calves has been found to result in animals that are:
 - Less anxious and reactive to environmental stimuli
 - Better developed in cognitive and social abilities
 - Quicker to adjust to post-weaning group housing

Many studies have evaluated feeding or housing systems. However, few studies have evaluated the benefits of feeding ad libitum in individual versus group housing.

OBJECTIVE

To evaluate the effects of feeding strategy and housing management on ADG and feed efficiency during the milk feeding phase in Holstein calves.

MATERIALS AND METHODS

Randomized Block Design

- 48 male and female Holstein calves were assigned randomly within blocks of 12 calves to 3 treatments
 - **FI:** Fixed (F) feeding of milk replacer to calves in individual (I) hutches (n = 4)
 - **AI:** Ad libitum (A) feeding of milk replacer to calves in individual hutches (n = 4)
 - **AG:** Ad libitum feeding of milk replacer with 4 calves housed in a group (G) hutche (n = 4)
- Experimental unit was a group of 4 calves

Feeding

- Calves were fed 675 g of colostrum replacer (Calf's Choice Total Gold, The Saskatoon Colostrum Co. Ltd.) within 2 h of birth
- A 24% CP and 20% fat milk replacer (4 Seasons 24-20, Poulin Grain) was fed at 14% solids
- A 23% CP calf starter (Dairy Focus Premium Calf Starter, Cargill Inc.) was fed ad libitum
- Weaning occurred over a 6 d period starting at week 7

Table 1. Milk replacer (g DM/d) feeding rate by treatment

Treatment	Pre-weaning		Weaning	
	1-15 d	15 d-Weaning	1-3 d	4-6 d
FI	770	900	450	450
AI	Ad libitum		900	450
AG	Ad libitum		900*	450*

* Amount fed on a per calf basis

Housing

- Calves were housed in hutches with modified feeding systems
 - Individual hutche (125 x 165 cm; w x d) with a fitted collar and lead (221 cm) attached to allow for exercise
 - Group hutche (264 x 203 x 198 cm; w x d x h) with an enclosed pen (488 x 290 cm; w x d) to allow for exercise



AI cooler setup, outside hutche



AI hutche and cooler setup



AI calf feeding, inside hutche



AG calves feeding, inside hutche



AG cooler setup, outside hutche

Data Collection

- Intake of milk replacer and calf starter were measured daily
- Body weight was measured weekly

Statistical Analysis

- Data collected weekly were reduced to a period mean (birth through weaning)
- Mean data were analyzed with the MIXED procedure of SAS with model effects of block and treatment
- Contrast statements of treatments FI vs. AI and AI vs. AG were used to separate the means

Table 2. Performance data of calves from birth through weaning

Variables	Treatment			P-value		
	FI	AI	AG	SE	FI vs. AI	AI vs. AG
Milk replacer intake, kg DM	40.6	59.7	54.8	3.4	<0.01	0.35
Starter intake, kg DM	11.2	4.5	2.2	1.8	0.04	0.41
Total intake, kg DM	51.7	64.2	57.0	3.5	0.05	0.20
Body weight gain, kg	28.0	39.3	40.3	3.4	0.06	0.84
Average daily gain, kg	0.56	0.75	0.81	0.05	0.04	0.43
Gain:feed	0.54	0.61	0.70	0.02	0.04	0.01

CONCLUSIONS

- Within individually housed calves, ad libitum feeding resulted in greater intake, average daily gain, and feed efficiency compared to fixed feeding.
- In ad libitum fed calves, housing did not have an effect on intake or weight gain, but group housing did result in greater feed efficiency.
- There may be benefits to group housing and the social interaction it provides calves, although potential mechanisms are unclear.

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