

Skim milk-based or whey-based milk replacer for calves from 4 weeks of age

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1. Introduction

- Dairy-beef calves are fed cow's milk and/or skim-based milk replacers (MR) until shipment
- Dairy-beef calves are sold 3 to 6 weeks old
- At the dairy-beef rearing farm, calves are fed a skim-milk-based MR, a whey-based MR or a combination of both depending on calves' age and MR prices
- Skim-milk-based MR is often more expensive than whey-based MR (i.e., 10-25% more expensive per kg powder)
- Basically, it should be possible to feed both types from birth?
- Often it is more a question about quality of MR ingredients and nutrient composition of the MR that is important and not the milk-protein-type per se

2. Objectives:

To compare a skim-milk-based MR with a whey-based MR fed to newly shipped 4 to 10 weeks-old dairy beef calves

Effects on growth rate, milk intake, and drinking pattern

3. Material and Methods

Calves:

32 calves purchased from 5 Holstein dairy herds (4, 6, 6, 8 and 8 calves per herd)

At least two calves of the same sex and breed combination from each herd

20 Holstein bulls, 4 Blue x Holstein bulls, 8 Blue x Holstein heifers

Calves were fed cow's milk and/or skim-milk based MR before arrival!

Calves 'defined' as being 14 days 'at time of purchase (actual ages from 9 to 19 days)

Calves were on average 49.5 kg at (i.e., ADG from birth to purchase was 5-600 g/d)

14 out of 32 calves had health-issues on day of arrival

Cases of pneumonia + navel inflammation + diarrhea at arrival were 10 in both treatment groups

Sick calves were treated

Special treatment with electrolytes and milk-bottle feeding day 0-3 of arrival

All calves completed the experiment

Milk feeding:

All calves were fed skim-milk-based MR day 14-17 of age (first 3½ days from arrival)

Mixing ratio:

155 g MR powder + 1.0 L water (i.e., 13.6% DM in MR)

Milk feeding level and weaning:

Day 14-17: variable but up to 7.6 L/d

Day 18-42: 7.6 L/d

Day 43-56: 5.0 L/d

Day 57-70: 2.5 L/d

Totally weaned at Day 70

Followed until Day 84

Milk feeders:

Förster Teknik (Vario Smart) x 2

Other feeds:

Concentrates:

Calf starter until day 50, ½ calf starter and ½ heifer concentrate until day 56, then heifer concentrate until day 84.

Starter intake day 56-60 (calves just started on 2.5 L MR/d) = 1.8 kg/d

Starter intake day 70-74 (right after calves were weaned) = 3.0 kg/d

Meadow hay, dried: ad libitum

Water: Water bowl, open surface

Salt: Licking block

Barn and pens:

Barn with 4 similar pens

Pens of 27 m², housing 8 calves (3.4 m²/calf)

Two milk feeders, water bowl, hay rack, and concentrate trough in each pen

Straw-bedded

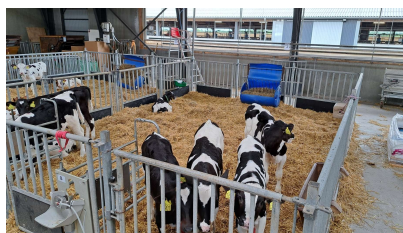
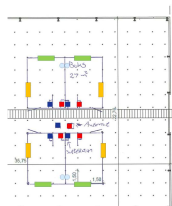


Fig. 1. 4 WHEY and 4 SKM calves in each pen

Treatments:

SKM: KIP 60, skim-milk based MR, DenkaVit

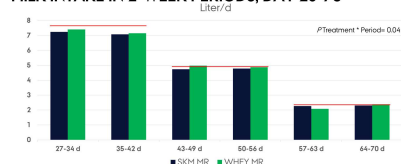
WHEY: KIP Excellent, whey-based MR, DenkaVit

Experimental feedings start at 18 days of age

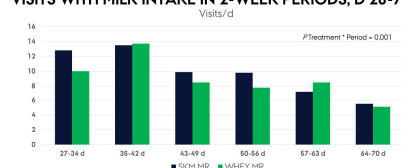
Thus, KIP Excellent (WHEY) is a NEW MR source of group WHEY

Experimental recordings start at 28 days of age

MILK INTAKE IN 2-WEEK PERIODS, DAY 28-70



VISITS WITH MILK INTAKE IN 2-WEEK PERIODS, D 28-70



UNREWARDED VISITS IN 2-WEEK PERIODS, D 28-70



The hypothesis was that a good quality whey-based MR could result in the same performance as a skim milk-based MR to newly shipped 4-week old dairy beef calves

✓ Confirmed

COMPOSITION OF MR (ACCORDING TO MANUFACTURER)

	SKM – Kip 60	WHEY – Kip Excellent
Skim milk powder	60%	-
Whey powder	Yes	Yes
Fat sources	Palm, coco, rape, soy	Palm, coco, rape
Wheat protein concentrate	-	Yes
Wheat flour	Yes	Yes
Wheat starch	Yes	-
Maltodextrin	Yes	-
Lactose	Yes	Yes
Dextrose	-	Yes
Sugar	Yes ?	-
Propan-1,2-diol	Yes	-
Technological	E321, E320, E433	Citric acid
Zootechnical, Bac. licheniformis, Bac. subtilis	Yes	Yes
Sensory, Furfuryl alcohol	Yes	Yes

COMPOSITION OF MR (ANALYZED)

	SKM – Kip 60	WHEY – Kip Excellent
Crude protein, %	23.5	23.5
Crude fat, %	19.4	19.5
Cellulose, %	<0.3	<0.3
Ash, %	7.7	9.0
Sugars (mostly lactose), %	29.4	29.0
Digestibility Organic matter, %	99.8	99.8
Dry matter, %	96.9	96.4
Sand Feeding Unit/kg feed	1.46	1.43

Conclusions

Based on performance and these two MRs, calves purchased at 4 weeks of age can be fed whey-based MR and perform equally well as if fed skim milk-based MR

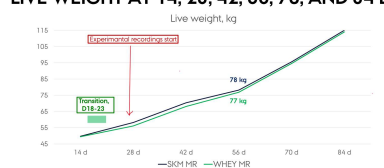
Remarks

- Calves fed cow's milk and or skim-milk-based MR before shipment and during the first 3-4 days after arrival, had lower growth rate during the transition period (18-24 d of age) compared to calves that stayed on the skim-milk-based MR
- Calves fed whey-based MR seems to seek the milk feeder more often but drink the MR quicker at the MR feeding levels used in this experiment
- Milk-feeding levels were chosen to mimic real-life milk feeding levels in dairy-beef farms.
- The milk feeding level used between d 42 and d 56 (5.0 L/d) was too low to obtain 8-900 g/d of ADG, and it can be recommended to feed a larger volume in this LW interval

MILK INTAKE AND DRINKING PATTERN OF SKM AND WHEY FED CALVES

	SKM	WHEY	SE	P
Milk intake, d 28-70, L/d	4.74	4.80	0.04	0.20
Milk powder, d 28-70, g/d	662	672	5	0.20
Drinking time, min/d	40.5	27.4	2.0	***
Visits with milk intake, n/d	9.8	8.9	0.3	0.10
Unrewarded visits, n/d	13.5	16.5	1.7	0.20
Total MR used, d 28-70, kg/calf	29.1	29.6		

LIVE WEIGHT AT 14, 28, 42, 56, 70, AND 84 D



ADG IN 2-WEEK PERIODS AND OVERALL

