PERFORMANCE OF CALVES FED A FIXED AMOUNT OF MILK REPLACER WITH OR WITHOUT RESTRICTIONS ON MEAL SIZE

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Calves are purchased from Danish dairy farms and raised intensively. 126,000 calves were slaughtered annually. The majority are Holstein calves (85%).

- 70,000 < 10 months of age (Rosé veal)
- 56,000 > 10 months of age (young bulls)

The dairy bull production is challenged:
- High infectious pressure
- Legislation regarding the use of antibiotics
- Animal welfare – the consumers’ right
- Low meat prices
THE TRANSITION PERIODS

- Calves are especially challenged when
  - Transported, mixed and changed feeding
  - Weaned - during the transition period

- Lower rate of nutrition post-weaning
  - Insufficient rumen development
  - Decreasing daily gain
  - Increasing use of antibiotics
MILK FEEDING STRATEGIES

- **Low amounts of milk or MR**
  - Encouraging solid feed intake
  - Higher morbidity and mortality

- **Higher amounts of milk or MR**
  - Higher level of nutrition
  - Increasing daily gain
  - Limitation of intake of solid feed
  - Minimal rumen activity and development
MILK FEEDING STRATEGIES

- High levels of milk in the first four weeks of life
  - Concentrate intake is negligible
  - Low feed utilization of solid feed
  - More milk improves daily gain, health- and welfare

- STEP-DOWN (STP)
  - Reduce milk intake after four weeks of life
  - Increase intake of concentrate to compensate for lack of energy
  - Solid feed will stimulate the rumen development
  - During weaning and post-weaning, the calf will be able to consume larger amounts of solid feed
AIMS OF THE INVESTIGATIONS

- The effect of step-down (STP) compared to conventional (CON) milk feeding strategies on solid feed intake and daily gain (ADG) during pre- and post-weaning periods, when both STP and CON calves are fed the same total amount of milk replacer over the entire milk feeding period.

- The effect of milk feeding frequency (FF) on the early solid feed intake and ADG, when the portion size is unrestricted and calves thereby are allowed to consume the daily ration in one meal (URES) compared to a restricted portion size of maximum 2.3 L (RES).

- Today’s talk will only focus on STP vs. CON
HYPOTHESES

- When calves fed according to STP, a higher total intake of solid feed is expected following the reduction in milk allowances thereby leading to a higher daily gain compared to calves fed according to CON.

- Small frequent meals (RES) will presumably stimulate the intake of solid feed compared to larger less frequent meals (URES), because the calves are still hungry until they have access to the automated feeder again.

Conversely, calves fed according to URES might have a greater solid feed intake compared to RES, because they experience an extended period between these larger milk feedings.
MILK FEEDING METHOD

Milk replacer = 21 % CP, 20 % fat
Concentrate = 19 % CP

Daily milk intake (L/d)

Age of calves (weeks)
TWO EXPERIMENTS

- 64 Holstein bull calves
- Purchased from 7 dairy farms
- Age = 11.7 (± 0.7) days = 2 weeks of age
- BW = 47.4 (± 0.9) kg
- Calves were fed by automated milk feeders
- Week 3-8 of age (milk feeding)
- Week 9-10 of age (post-weaning)

- **Experiment 1A:**
  - September – November
  - Automated concentrate feeders

- **Experiment 1B:**
  - February – April
  - Concentrate throughs
CONCENTRATE INTAKE PRE- AND POST-WEANING

R² = 0.4162
CONCENTRATE INTAKE

Week 3-10: P = 0.08
Week 9-10: P < 0.01

- Not all calves were offered concentrates from birth to entrance in experiment 1A
- Concentrate feeders vs. troughs
- Social facilitation differences?
CONCENTRATE INTAKE: CON VS. STP

Week 5-6 of age (post step-down)
- 1A: 0.15 vs. 0.27 kg/d *
- 1B: 0.35 vs. 0.56 kg/d

Week 3-8 of age (milk feeding period)
- 1A: 0.37 vs. 0.44 kg/d
- 1B: 0.50 vs. 0.66 kg/d

Week 9-10 of age (postweaning)
- 1A: 1.91 vs. 2.03 kg/d
- 1B: 2.71 vs. 2.85 kg/d
AVGAGE DAILY GAIN: CON VS. STP

* CON and STP are significant different within week.
CONCLUSIONS (STP VS. CON)

- The milk feeding strategies did not affect overall feed intake and ADG in the present experiment

- Intake of solid feed was greater for calves fed STP compared to CON when MR was reduced from 8 to 5 L/d

- Challenges regarding shipping age, health, draught and use of the concentrate feeder (EXP1A) might have limited the performance

- The long-term effects of STP vs. CON on growth performance until slaughter will be evaluated
FEEDING FREQUENCY (FF)

MR: Amount and feed delivery – what would mom do?
- Maybe calves should be fed greater amounts of MR until four weeks of age?
- Bucket vs. nipple feeding

Does the FF matter?
- Insulin sensitivity decreases when feeding higher milk allowances in two meals per day (4 vs 2 L/meal) (Terré et al., 2009; Bach et al., 2013)
- Three times feeding - is it possible in practice, when feeding the calves manually?
- Economic benefits