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Effects of close-up period dietary cation-anion difference on post-calving performance of dairy cows of different body condition score

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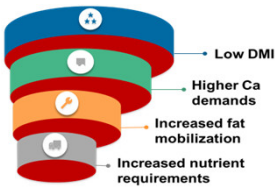
INTRODUCTION & AIM

Introduction: Due to physiological challenges, complete lactation is associated with the transition period success of dairy cows. Cows with high body condition score (BCS) at calving lose more BCS and experience higher postpartum metabolic issues including hypocalcemia compared with those at low BCS (Roche et al. 2007) to cause severe economic losses (Abdelhameed et al., 2016).



Metabolic disorder	Estimated cost per case (USD)
Hypocalcaemia	335
Subclinical Hypocalcaemia	125

Objective/Aim: The objective of study was to compare the effects of control vs. -ve dietary cation anion difference (DCAD) diet during close-up on postpartum performance of low vs. high BCS cows. We hypothesized that Low & high BCS cows benefit similarly from -ve close-up DCAD diet

METHODS

Cows

Forty Holstein dairy cows were enrolled at −21 d relative to calving

Treatments

Cows were blocked according to parity, previous lactation yield, and expected date of calving. Enrolled cows were assigned to one of the four treatments (n=10/group):

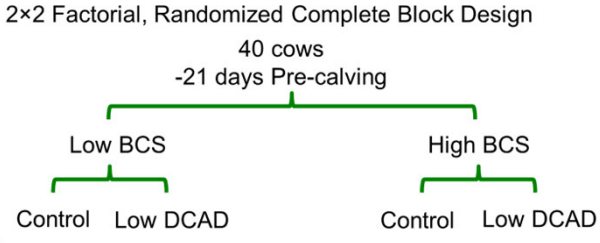
- Low BCS control (LBCS-CN)
- Low BCS negative DCAD (LBCS-ND)
- High BCS control (HBCS-CN)
- High BCS negative DCAD (HBCS-ND)

Treatment diets were fed from −21 day relative to expected calving until calving day.

The LBCS and HBCS cows had ≤ 3.00 and ≥ 3.25 BCS, whereas DCAD of CN and ND diets were +100 and −100 mEq/kg of dry matter, respectively.

Chlorides and sulfates of Mg and Ca were used, while DCAD = [(Na+K)-(Cl+S)] following NRC (2001). Study was approved by ethical committee for animal welfare at University of Veterinary & Animal Sciences, Lahore, Pakistan.

Experimental Layout



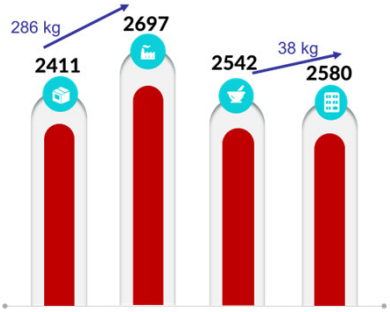
Statistics

Repeated measures analysis was conducted using GLIMMIX procedure of SAS.

RESULTS

Daily milk yield and milk composition remained unaffected by dietary treatments (p>0.01)

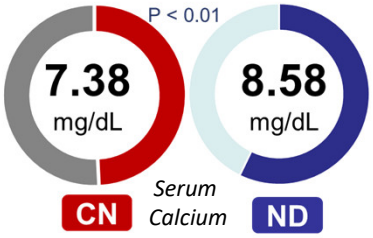
Item	LBCS-CN	LBCS-ND	HBCS-CN	HBCS-ND
Postpartum				
Actual milk, kg/d	39.8	40.9	40.0	43.2
Fat, %	3.90	3.80	3.87	3.69
Protein, %	2.88	2.90	2.91	2.86
Lactose, %	4.29	4.32	4.33	4.29

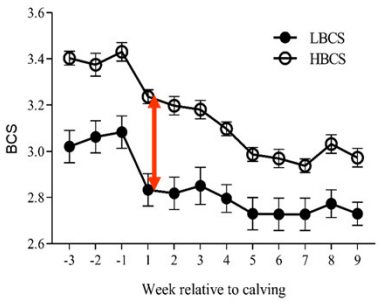


63 days cumulative milk yield

Prepartum ND versus CN cows produced 286 kg higher milk when fed to HBCS cows but this increase was only 38 kg when fed to LBCS cow during the first 63 days in milk.

Postpartum serum calcium concentration increased in ND vs. CN cows





The HBCS cows continued to lose higher BCS compared with the LBCS cows during the postpartum period (P < 0.05).

CONCLUSION

- Negative DCAD during the close-up period is equally beneficial in low & high BCS cows to increase postpartum calcium level and decrease β-hydroxybutyrate
- No interaction was detected between BCS & DCAD level for postpartum production performance, and metabolic parameters of dairy cows.

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