

Negative Dietary Cations Anions Difference (Milk fever)



Last update: 2 June 2023

- **Type of Challenge:** Animal Health.
- **Challenge:** Milk fever (hypocalcaemia).
- **Action:** Reduction of the risk of milk fever and subclinical hypocalcaemia.
- **Animal category:** Dairy cows.
- **Technique:** Feeding acidogenic diets prepartum (anionic compounds: Ca, P, Mg, Na, K, Cl, S).
- **Mode of action:** A negative Dietary Cations Anions Difference (DCAD) causes mild metabolic acidosis, which increases the production of Vitamin D3; this results in an increased mobilisation of calcium from the bones and uptake from the intestines and maintains the calcium level in the blood.
- **Potential efficacy:** Acid-base status can be readily assessed through urine pH (a target urine pH during the prepartum period between 6.0 and 7.0).
- **Nature of evidence of efficacy:** Peer-reviewed scientific publications (meta-analysis); Regulation (EU) 2020/354 on particular nutritional purposes.
- **Factors impacting on efficacy:** Variable individual intake of the animal (palatability of ration); level of calcium in the ration associated with the level of DCAD.
- **Mode of use:** Minimum acidification via feed for particular nutritional purpose: 100 mEq/kg dry matter, from 3 weeks before calving until calving.
- **Requirements/limitations:** To be placed on the market in accordance with Regulation (EU) 2020/354; anionic salts should be included in the mixed rations due to their poor palatability.
- **Economic consequences:** Reduced economic losses occurring from milk fever (loss of milk, veterinary costs, labour costs and possible premature culling).
- **Other considerations:** Flavour components may be added into the diet, to reduce the negative effect on feed intake of poor palatability of anionic salts; overdosing anionic salts may induce a more severe metabolic acidosis.
- **References:**
 - [Commission Regulation \(EU\) 2020/354](#) of 4 March 2020 establishing a list of intended uses of feed intended for particular nutritional purposes and repealing Directive 2008/38/EC.
 - J P Goff , R Ruiz, R L Horst (2004). *Relative acidifying activity of anionic salts commonly used to prevent milk fever*. Journal of Dairy Science 87(5):1245-55, PubMed. [https://doi.org/10.3168/jds.S0022-0302\(04\)73275-0](https://doi.org/10.3168/jds.S0022-0302(04)73275-0)
 - Pedro Melendez, Prasanth K. Chelikan (2022). *Review: Dietary cation-anion difference to prevent hypocalcemia with emphasis on over-acidification in prepartum dairy cows*. ScienceDirect. <https://doi.org/10.1016/j.animal.2022.100645>

- J.E.P. Santos, I.J. Lean, H. Golder, E. Block (2019). *Meta-analysis of the effects of prepartum dietary cation-anion difference on performance and health of dairy cows*. Journal of Dairy Science 102 (3): 2134-2154. <https://doi.org/10.3168/jds.2018-14628>
- K.M. Glosson, X. Zhang, S.S. Bascom, A.D. Rowson, Z. Wang, J.K. Drackley (2020). *Negative dietary cation-anion difference and amount of calcium in prepartum diets: Effects on milk production, blood calcium, and health*. Journal of Dairy Science 103 (8) :7039-7054. <https://doi.org/10.3168/jds.2019-18068>
- **Other techniques:** Supplementation during the 3/4 weeks before calving of a diet containing zeolite or rumen protected feed materials rich in phytic acid and high in calcium; provision of highly available sources of calcium (chloride, sulphate, carbonate, propionate, formate, pidolate, etc.) from first signs of parturition until 2 days after parturition.

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