

Effects of long-term postbiotic supplementation on dairy heifer calves:

Health status and wound healing after dehorning

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Introduction

- The use of **postbiotics** could be beneficial due to the fact that a postbiotic combines the microorganism (probiotic) and fermentation products (prebiotic).
- **Little is known** on the effects of postbiotics on health in dairy ruminants.

Objective: to evaluate a novel postbiotic (**Probisan®**; lactic acid bacteria + non-bitter fermented yeast) on the **health status** of dairy heifer calves from birth to 120 days.

Materials & Methods

Animals and Treatments:

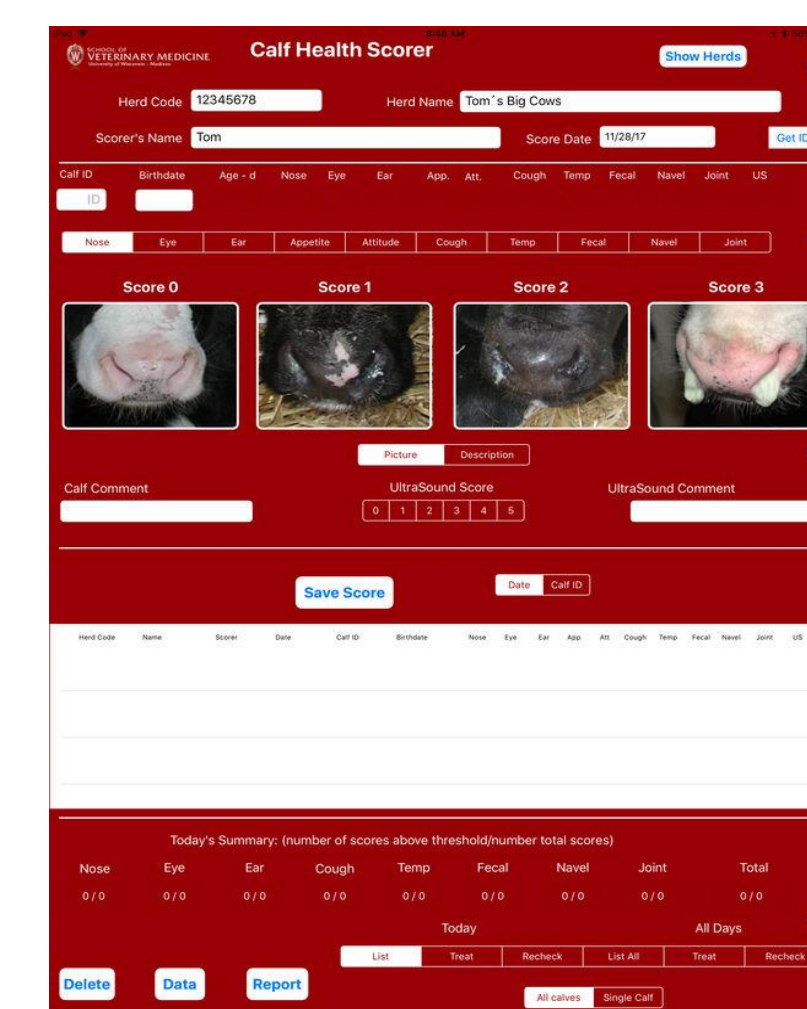
- Jersey-Holstein **dairy heifer calves** (n = 70)
- 2 groups:
 - No supplementation; control (**CON**; n = 35)
 - Supplementation with **Probisan®** (**PRO**; n = 35)
 - **3.0 g/d** from d 3 until weaning at wk 8
 - **1.5 g/kg** concentrate mixture from wk 9 to 18



- **Dehorning** at 43 ± 2 d of age after the administration of a nonsteroidal anti-inflammatory drug and a sedative.

Procedures & Sampling:

- **Monitoring Calf Health Score** (App, UW-Madison, Madison, WI):
 - 1) **general health** parameters (0 = normal, 3 = very abnormal),
 - 2) **fecal consistency** (0 = normal, 3 = watery feces),
 - 3) **nasal discharge** (0 = normal, 3 = mucopurulent discharged),
 - 4) **cough** (0 = normal, 3 = repeated spontaneous coughs).



- **Wound Healing status following Dehorning** at days 10 and 20 using a customized numerical rating scale of 1 to 3, where:

- 1 = **no infection** (dry exudate and adequate closure of wound surface),
- 2 = **inflammation** (mild moist thickened serous exudate),
- 3 = **infection** (moist thickened purulent exudate).



Statistical Analyses:

- **Proc FREQ** of SAS v. 9.4 (SAS Instit. Inc., Cary, NC) to determine the percentage of calves in each score. **Logistic model** was used for the discrete values (1, 2 or 3).

Results

- **Fecal consistency:** Diarrhea (score ≥ 2; loose feces but stays on top of bedding) was the most frequent disease observed in 13 and 12 calves at 13 ± 1.9 and 11 ± 1.2 d old for **CON** and **PRO** groups, respectively.
- **Cough:** Only 1 calf/group had repeated occasional spontaneous coughs (score 3), and received 4 days of treatment to prevent pneumonia.
- **Dehorning:**
 - **Wound healing:** average wound score after dehorning was greater ($P < 0.05$; Figure 1) in **CON** than in **PRO** calves at d 10 (1.77 vs. 1.38; SEM = 0.13) and d 20 (1.51 vs. 1.18; SEM = 0.11).
 - **At d 10 after dehorning**, almost 50% of the **CON** calves presented either wound inflammation or infection (20.0% score 2, and 28.6% score 3), while only 27% of **PRO** calves suffered wound healing problems (14.7% score 2, and 11.8% score 3).
 - **At d 20 after dehorning**, **PRO** calves had lower ($P < 0.05$) percentages of score 2 (5.9 vs 14.3%) and score 3 (6.0 vs 17.1%) compared to **CON** calves.

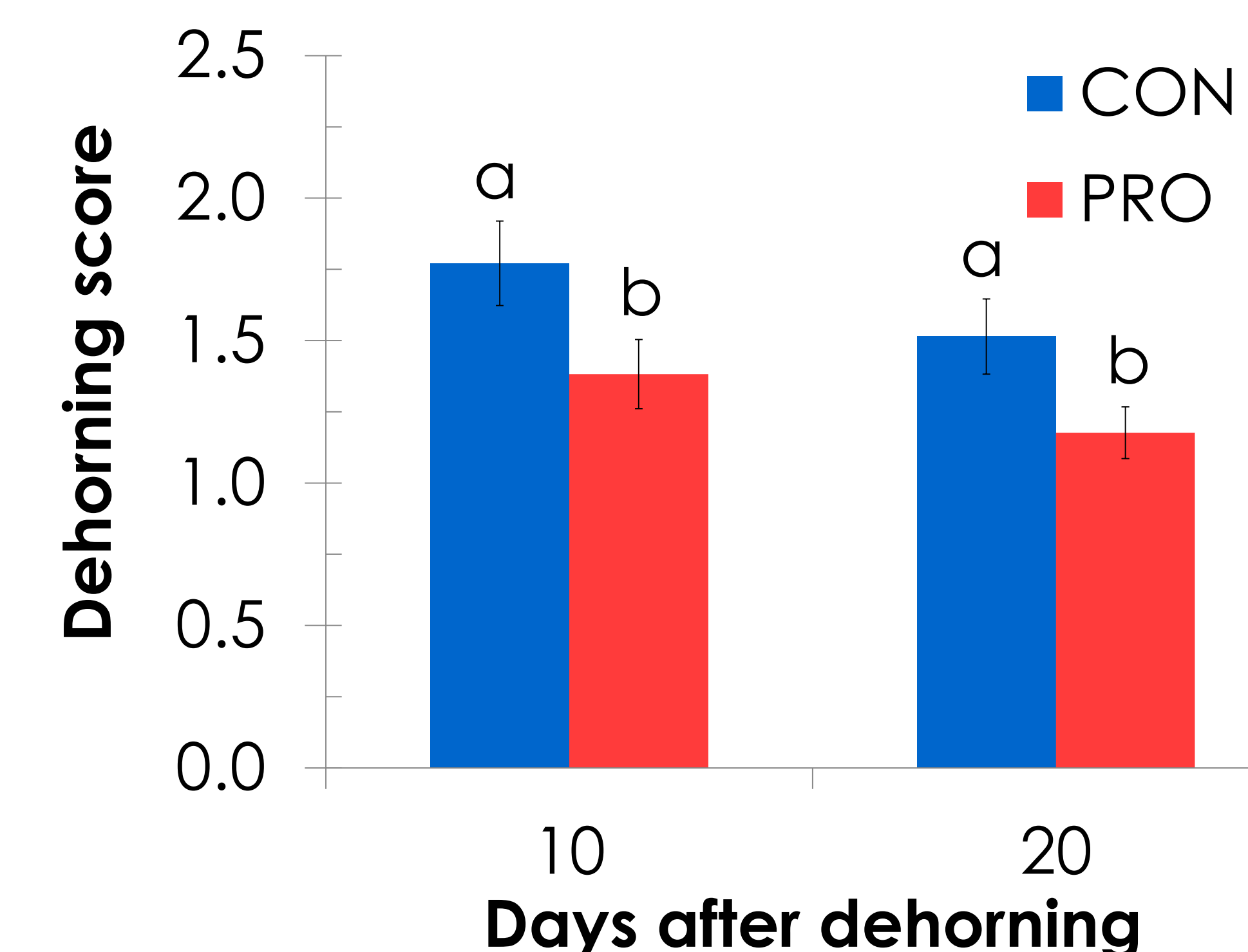


Figure 1. Average dehorning score in dairy heifer calves without supplementation (CON) or supplemented with Probisan (PRO). ^{a,b} indicate significant difference at $P < 0.05$. Error bars = SEM.

Conclusion

Better wound healing after dehorning in the calves supplemented with Probisan® suggests an improvement in the immune status.

Implication

This finding highlights the usefulness of postbiotic supplement when animals are exposed to stress situations or adverse conditions.

Acknowledgements: Research funded by **PENTABIOL**, S. L. Navarra, Spain and supported by **Hammink Dairy** LLC, Bruce, SD. Sincere thanks to the farm crew for their exceptional care of the animals.