Short and Long Term Effects of using a Probiotic on Calves Until Weaning

Don Pearson, Technical Director, BioBrew Ltd. don@freshprobiotics.com

What are Probiotics?

The World Health Organisation (WHO) and Food and Agriculture Organisations of the United Nations use the following definition of Probiotics; 'Live microorganisms which when administered in adequate amounts confer a health benefit on the host' (4).

Introduction

The use of fresh, multi-strain, probiotics has been advanced as a substitute for the unsustainable use of antibiotics in raising calves (1). Their efficacy has been demonstrated on calves although the efficacy of a single strain of yeast, *Saccharomyces cerevisiae* var *boulardii*, has been called into question by recent work on calves (2). Few independent studies have been used to determine if there are long term benefits to the animals and the farmers.

Method

In the spring of 2012 296 calves on 3 farms were included in a MPI Sustainable Farming Fund (SFF L12-083) and DairyNZ funded probiotic supplementation study undertaken by the Clutha Agriculture Development Board.

BioBrew Ltd was chosen as the probiotic provider as their fresh, easy to use product, tested much higher in Lactobacillus cfu (colony forming units) in a previously published paper (3). Full details of the methods used are available from:

http://www.agboardnz.co.nz/Probiotic_Supplement_Calf_Trial

In 2016 further SFF (SFF # 404979) and industry funding was obtained to see if the question "Are there long-term advantages in giving probiotic supplements to neo-natal calves?" through the examination of standard records kept on the 3 farms of the earlier study. Full details of the methods used are available from:

http://www.agboardnz.co.nz/Probiotic_data_collection_project_2016-17

Early Results

The use of the fresh probiotic resulted in a statistically significant ($p<0.05$) result (5) as shown below in Table 1.

Table 1 The Effect of Probiotic Supplementation on Calf growth rate for the first 100 days (kg/day)

	Probiotic	**Control**	**Difference**	**Statistical Significance**
Farm 1	0.665	0.658	+7g/day	NS
Farm 2	0.602	0.548	+54g/day	$P < 0.01$
Farm 3	0.574	0.527	+47g/day	$P < 0.02$

CALFBREW®

Lactation Results

Lactation yield data was retrieved from the 2015-16 season and until February 2017 for the 2016-17 season (6). Milk solid yields for the two above mentioned seasons are shown in Table 2 below.

Table 2 Effect of Calf Probiotic Supplementation on Milk Solid (MS) production as Adults. (kg MS/cow/annum)

	Probiotic	**Control**	**Difference**	**Statistical Significance**
2015-16	342	328	14	P < 0.03
2016-17*	302	294	7	NS

* Results until February 2017 from only 2 of the 3 farms

Survival Data

In addition, other data were available on survival and retention in the herd. Retention in the herd was variable within and between farms making quantitative analysis difficult (6). Table 3 presents mortality and retention data for farms where it was available.

Table 3 Effect of Calf Probiotic Supplementation on mortality rates and the likelihood of remaining in the herd after 4.5 years (%)

	Probiotic	**Control**	**Difference**
% Mortality*	0%	10%	+10%
% Retention#	65%	59%	+6%

* Results from only 2 of the 3 farms

% of female calves being milked as adults

Conclusions

The use of the fresh intact probiotic supplied by BioBrew Ltd. increased the rate of calf growth by up to 10%.

As adults, the treated calves produced significantly more milk solids in the 2015-16 season. These cows were also less likely to die and were more likely to still be in the herd.

The use of a fresh probiotic on calves has both short term and longer term benefits to both stock and farmers.

The SFF report (6) concludes “This is real, on-farm data and indications that are not easily obtained and the powers that be in the dairy industry should take note.”

References

1) H. M. Timmerman, L. Mulder, H. Everts,1 . C. van Espen, E. van der Wal, G. Klaassen, S. M. G. Rouwers, R. Hartemink, F. M. Rombouts, and A. C. Beynen 2005 “Health and Growth of Veal Calves Fed Milk Replacers With or Without Probiotics” J. Dairy Sci. 88:2154–2165

2) Z.X. He, B. Ferlisi, E. Eckert, H.E. Brown, A. Aguilar, M.A. Steele, 2017 “Supplementing a yeast probiotic to pre-weaning Holstein calves: Feed intake, growth and fecal biomarkers of gut health” Animal Feed Science and Technology 226 (2017) 81–87

3) G Bennett, R Rajan, CR Bunt & MA Hussain 2013. “Microbiological assessment of four probiotic feed supplements used by the dairy industry in New Zealand”. New Zealand Veterinary Journal Vol. 61 , Iss. 2

4) Joint FAO/WHO Working Group 2012. http://www.who.int/foodsafety/fs_management/en/probiotic_guidelines.pdf Accessed 25 May 2017

5) Malcolm Deverson, Project Manager Clutha Agricultural Development Board, July 2013 “Summary report on project SFF L12-083: The effects of a probiotic supplement on growth, feed conversion and general health of dairy calves” http://www.agboardnz.co.nz/data/_uploaded/file/projects/SFF-L12-083-Probiotics-and-calf-trial-Summary-Report-Jul13.pdf

6) FINAL Project Report - Malcolm Deverson for the Clutha Agricultural Development Board – 24 May 2017, http://www.agboardnz.co.nz/data/_uploaded/file/projects/Report%20to%20farmers%20FINAL%20May17.pdf

CALFBREW®