TECH'INFO

ActiSaf

Comparison of the effect of live yeast *vs.* sodium bicarbonate on the ruminal ecosystem and feed efficiency

Objective: Assess Actisaf® Sc 47 mode of action and impact on ruminal balance of dairy cows, in comparison with sodium bicarbonate.

Trial design

Comparative experimental study
Location: France

Species/life stage

Dairy cows in early lactation
Breed: Holstein

Main criteria

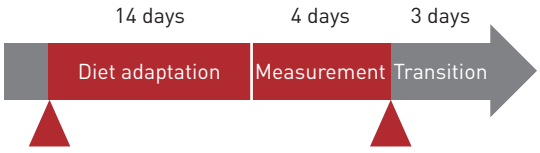
Rumen pH, rumen redox potential (Eh), digestibility, rumen VFA profile, lactate concentration in the rumen.

Reference

Marden *et al.*, 2008 – J. Dairy Sci. 91:3528–3535.

Protocol

3 x 3 latin square design
3 cows
3 periods



Main results

↑ Rumen pH: +3.4% Actisaf® *vs.* control

↓ Rumen redox potential (Eh):

-29.6% Actisaf® *vs.* control

-8.8% Actisaf® *vs.* sodium bicarbonate

↓ Rumen lactate:

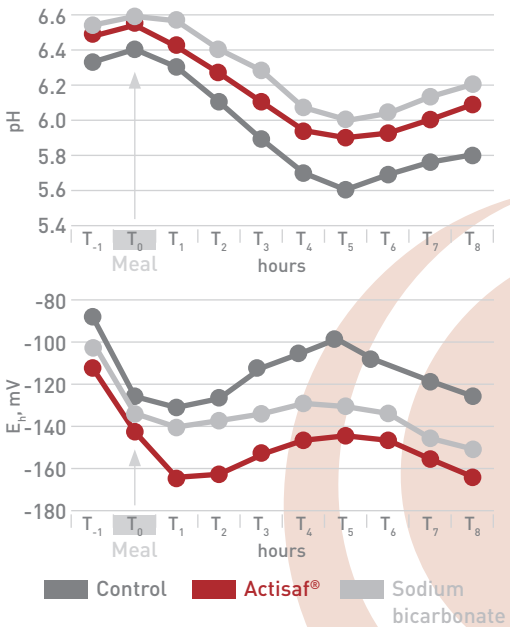
-67.3% Actisaf® *vs.* control

-55.7% Actisaf® *vs.* sodium bicarbonate

↑ Rumen fermentation:

+16.5% total VFA Actisaf® *vs.* control

+4.3% total VFA Actisaf® *vs.* sodium bicarbonate



Conclusion

This study allowed to differentiate the effects of Actisaf® Sc 47 from sodium bicarbonate on the ruminal ecosystem. Actisaf® Sc 47, by decreasing the redox potential in the rumen, promotes the growth of lactic acid and fibre fermenting bacteria which leads to higher rumen pH, similar to sodium bicarbonate, but additionally improves fibre digestibility.

137, rue Gabriel Péri - BP 3029
59703 Marcq-en-Baroeul Cedex - France
Tel.: 00 33 3 20 81 61 00 - Fax: 00 33 3 20 99 94 82
info@phileo.lesaffre.com
phileo-lesaffre.com

Phileo
LESAFFRE ANIMAL CARE

R1605

TECH'INFO

Introduction

Modern feeding strategies have changed from primarily forage-based to progressively more readily fermentable carbohydrate feedstuffs in dairy rations to meet the increasing milk yield of high producing animals. As a result, they can lead to the appearance of digestive disorders such as subacute ruminal acidosis (SARA).

Materials and methods

Three early-lactation Holstein cows were involved, with a mean milk production of 45 kg/d per cow at the beginning of the trial. They were assigned to three treatments: a control diet, a sodium bicarbonate diet, and a live yeast diet, in a 3 × 3 latin square design.

- **Control group**: cows were fed a basal diet, which consisted of a total mixed ration (TMR) offered twice daily in equal portions at 9 am and 5 pm. During each 21-day experimental period (14 days of adaptation to the diet, 4 days of measurement, and a 3-day transition phase), the daily feeding rate was adjusted to 28 kg/cow on a dry matter basis.
- **Sodium bicarbonate group**: cows were fed the basal diet and supplemented with 150 g of sodium bicarbonate per cow per day.
- **Actisaf® group**: cows were fed the basal diet and supplemented with 5 g of Actisaf® Sc 47 per cow per day.

Results and discussion

Ruminal pH

The ruminal pH in the Control group varied between 6.41 and 5.57 during 8 hours after the morning meal, with a mean pH of 5.94 ; whereas in the Actisaf® group, the pH reached a peak at 6.53 and a minimum value of 5.90 with a mean of 6.14, which is significantly higher than in the Control group. This higher pH therefore helps to reduce the risk of acidosis.

Ruminal redox potential (Eh)

The redox potential of the ruminal fluid had a mean value of –115 mV for the Control group, a mean of –137 mV for the Sodium bicarbonate group, and a mean of –149 mV for the Actisaf® group. The mean Eh values of all groups differed and when compared with Control group, the decrease in rumen Eh was more pronounced in the Actisaf® group than in the Sodium bicarbonate group (34 *vs.* 22 mV, respectively).

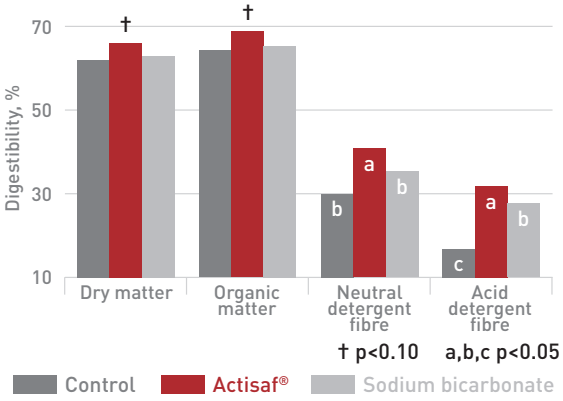
Volatile fatty acids and lactate concentrations

The ruminal propionate concentration did not differ between the Control group diet and the Sodium bicarbonate group, whereas it increased significantly in the Actisaf® group. Actisaf® Sc 47 supplementation also led to a significant decrease in ruminal lactate content, whilst the addition of sodium bicarbonate did not show any significant effect.

	Control	Actisaf®	Sodium bicarbonate
Total VFA (mM)	85.3*a*	99.4*b*	95.3*b*
Acetate (mM)	53.2*a*	59.1*b*	60.8*b*
Propionate (mM)	**18.0*a***	**25.8*b***	**20.0*a***
Butyrate (mM)	10.6	10.2	10.1
Lactate (mM)	**16.5*b***	**5.4*a***	**12.2*b***

Fibre digestibility

Total tract neutral detergent fibre (NDF) and acid detergent fibre (ADF) digestibility was greater in the Actisaf® group than in the Sodium bicarbonate group and the Control group (p<0.05).



Conclusion

This trial allowed to differenciate the modes of action of Actisaf® Sc 47 and sodium bicarbonate: it showed that sodium bicarbonate mainly buffers excess of acid in the rumen whereas Actisaf® Sc 47 has a combined action on ruminal ecosystem, by strengthening the reducing conditions of the rumen and modulating ruminal microbiota.

Keywords Actisaf® Sc 47, live yeast, sodium bicarbonate, ruminal pH, redox potential (Eh), VFA, lactate, digestibility.

Reference J. P. Marden, C. Julien, V. Monteils, E. Auclair, R. Moncoulon, and C. Bayourthe, 2008. How does live yeast differ from sodium bicarbonate to stabilize ruminal pH in high-yielding dairy cows? J. Dairy Sci. 91:3528–3535.

Actisaf-TI-R1605-16.03-EN