

Meta-Analysis of the Effect of Levucell SC on Milk Production and Feed Efficiency



In 2009, independent researchers Mary Beth de Ondarza and Charlie Sniffen presented at ADSA a Meta-analysis on the effect of Levucell SC on milk production and feed efficiency (JDS Vol.92, suppl.1-279).

Across multiple experiments, Levucell SC :

- ◆ Significantly Improved Feed Efficiency (**1.70 vs. 1.75**; $P < 0.001$)
- ◆ ...with a greater effect for cows producing >84 lbs milk/d (**1.78 vs 1.85**; $P < 0.05$)
- ◆ Significantly increased FCM production by 2.1 lbs per day (**76.16 lbs vs 78.28 lbs**; $P < 0.001$)
- ◆ ...with no difference in feed intake.

“Meta-analysis” or “Multi study analysis” both have the same meaning: they help to predict the responses of a treatment in complex biological, environmental, and management situations.

The value is: 1) to determine the average effect of a treatment and its variation across different protocols: diet, physiological status of the experimental units, different experimental design. 2) to help identify some potential factors that modulate the response to a treatment (e.g., do cows in early lactation respond more favorably to a probiotic than late lactation cows?).

Trials were conducted under institute or practical farm conditions. Levucell SC was incorporated under practical feeding practice in the feed or in supplement at a dosage of 10×10^9 (10 billion) CFU/d.

Materials and Methods

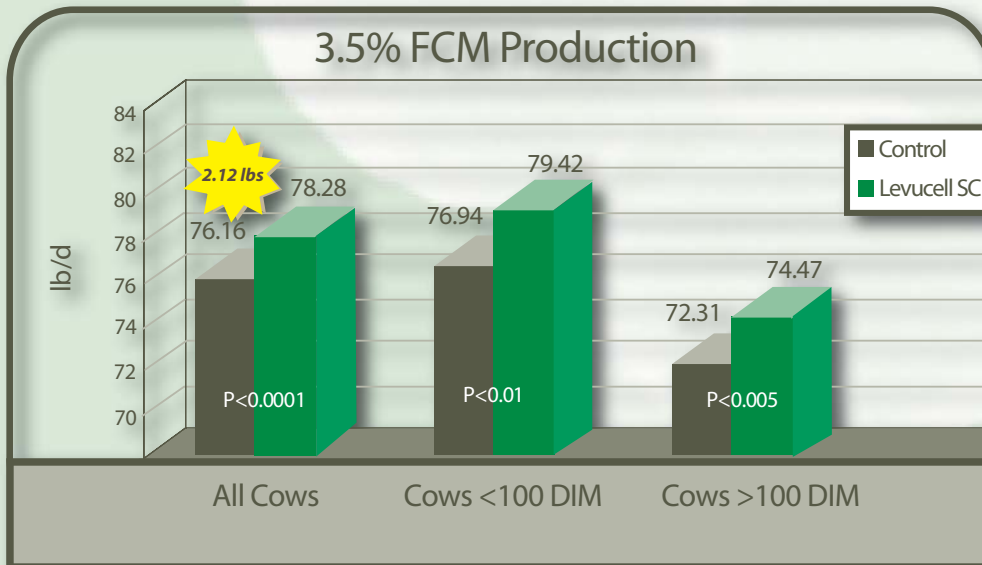
A dataset with diet information and product responses was compiled from fourteen research trials conducted internationally (160 observations representing 1615 cows) that tested the effect of dietary inclusion of live yeast (Levucell SC[®] (10×10^9 (ten billion) CFU/d).

Diet and feed analysis data for each study was entered into CPM Dairy 3.0.8 to estimate dietary nutrient parameters.

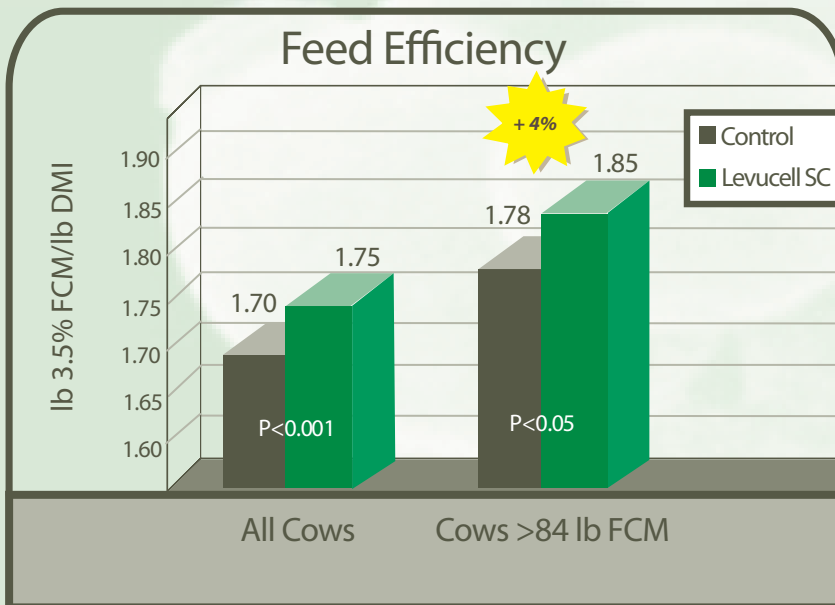
A Meta-analysis helps to predict the effect of a product like Levucell SC

Production and Diet Characteristics of Experiments			
	Mean	Min.	Max.
Milk (lb)	69.59	34.18	95.21
Milk Fat (%)	3.75	2.76	4.50
Milk True Protein (%)	3.02	2.71	3.47
DM Intake (lb)	42.38	24.28	59.98
CP (%DM)	17.32	13.90	22.20
Soluble CP (%CP)	34.13	20.94	47.56
Ether Extract (%DM)	4.54	3.140	6.50
NDF (%DM)	34.91	26.80	42.40
Sugar (%DM)	5.46	3.30	10.80
Starch (%DM)	22.82	3.40	36.50

Number of cows per treatment was included as a weighting factor and experiment was included in the models as a random effect.



- ◆ Levucell SC significantly increased 3.5% **FCM production** by 2.12 lbs (**76.16 lbs vs 78.28 lbs; P < 0.0001**).
- ◆ The effect was greater for cows <100 DIM (**76.94 vs 79.42 lbs; P < 0.01**) BUT still highly significant for cows >100 DIM (**72.31 vs 74.47 lbs; P < 0.005**).



- ◆ Feed Efficiency was significantly improved with Levucell SC (**1.75 vs 1.70; P < 0.001**)
- ◆ Levucell SC effect on Feed Efficiency was greater for high producing cows producing >84 lbs milk/d (**1.78 vs 1.85; P < 0.05**).

The improvement in 3.5% FCM yield and feed efficiency, with the inclusion of Levucell SC without any effect on DMI ($P > 0.10$), could be a consequence of improved rumen function (Chaucheyras-Durand and Fonty, 2001, Bach et al., 2007). Increasing fiber digestion (Guedes et al, 2008) and controlling rumen pH increases microbial protein yield because more substrate is available. Further investigations should provide opportunities to design optimized diets with the inclusion of Levucell SC.

References
 Bach A., C. Iglesias, and M. Devant. 2007. Daily rumen pH pattern of loose-housed dairy cattle as affected by feeding pattern and live yeast supplementation. *Animal Feed Science and Technology*. 136:146-153.
 Chaucheyras-Durand, F. and G. Fonty. 2001. Establishment of cellulolytic bacteria and development of fermentative activities in the rumen of gnotobiotically-reared lambs receiving the microbial additive *Saccharomyces cerevisiae* CNCM I-1077. *Reprod. Nutr. Dev* 41:57-68.
 Guedes C.M., D. Goncalves, M.A.M. Rodrigues, and A. Dias-da-Silva. 2008. Effect of yeast *Saccharomyces cerevisiae* on ruminal fermentation and fiber degradation of maize silage in cows. *Animal Feed Science and Technology*. 145:27-40