



*Show Me the Money!
What is the Return on
Investment (ROI) When Using
Yeast Probiotics in Dairy
Cattle Diets*

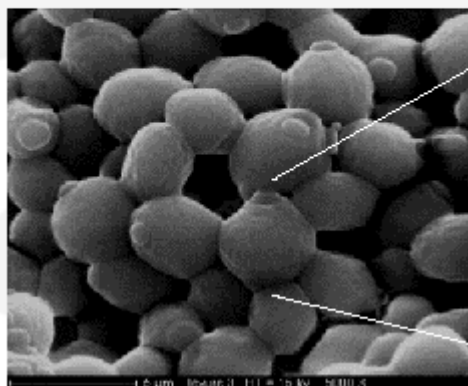
*Stephen M. Emanuele, Ph.D., PAS
Phileo Lesaffre Animal Care
Head, North American Dairy Program*



Saccharomyces cerevisiae- the oldest industrial microbe

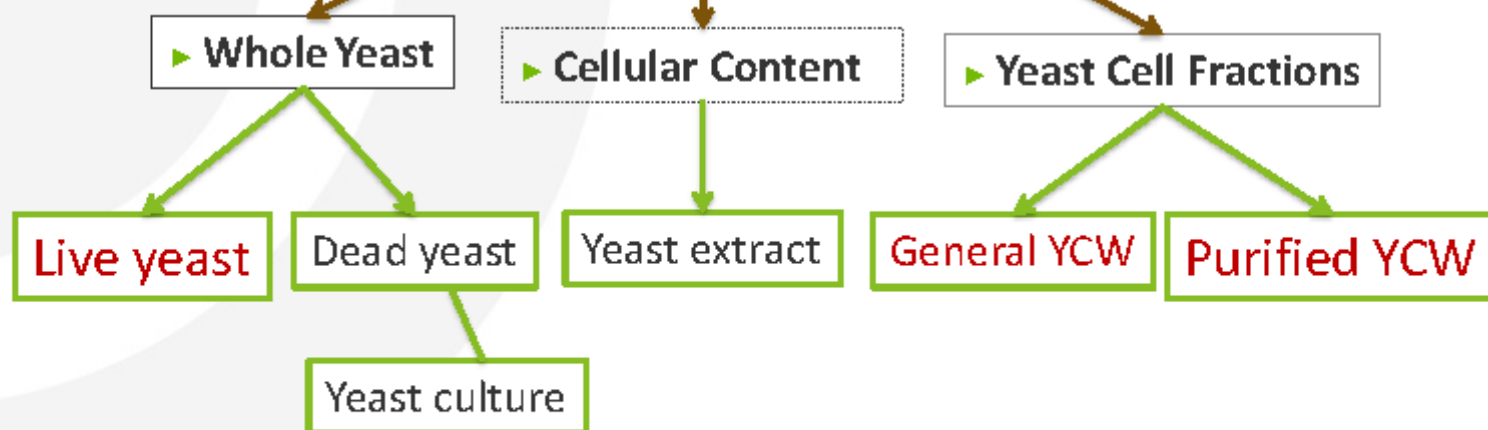


Yeast Prebiotics and Probiotics: What are they?



Probiotic is a live organism such as live yeast.

Prebiotic is a killed organism such as yeast culture or yeast cell wall.





Yeast Products Functionality

Live yeast

Metabolically active.
Optimizes the environment to enhance beneficial bacteria growth.

Yeast Culture

Nutrient source for rumen bacteria and for the animal.

Yeast extract

Highly concentrated nutrient source.
Water soluble.

General YCW

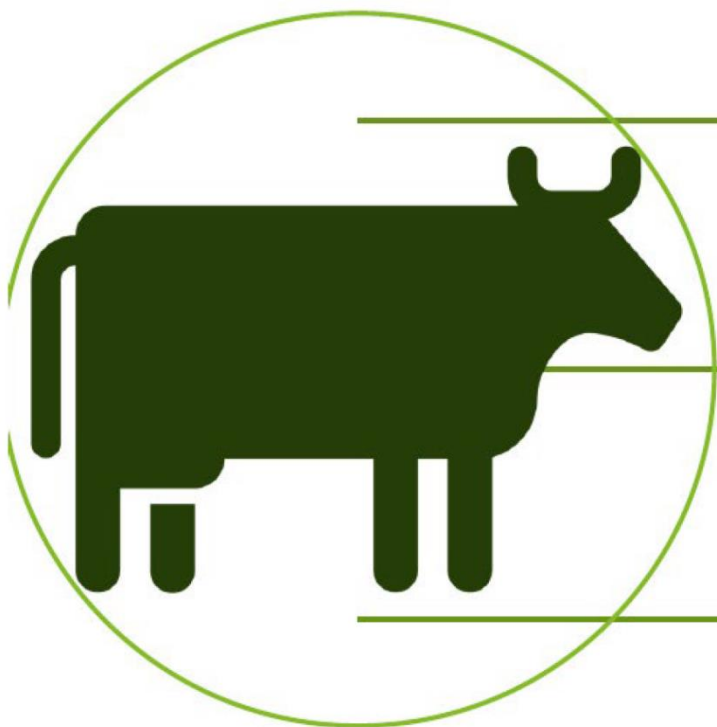
Undefined structure and composition that may vary.
Able to bind certain mycotoxins.
Weak binding of certain bacteria

Purified YCW

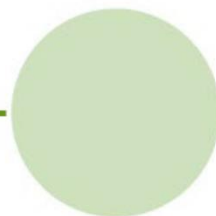
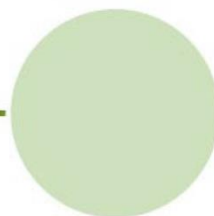
Defined structure and composition.
Reliable mycotoxin binding
Strong bacteria binding
Immune system modulation.



Yeast solutions: probiotic yeast



Rumen
enhancer

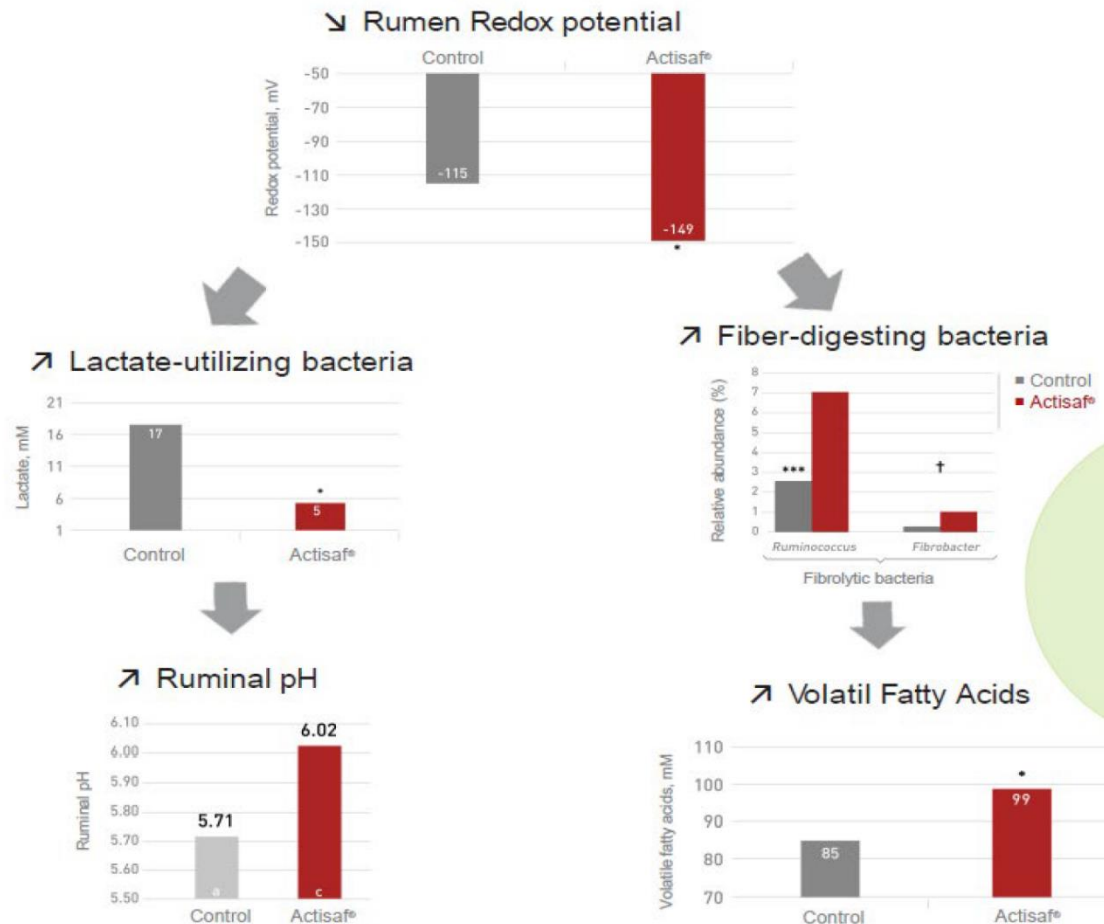


Phileo

LESAFFRE ANIMAL CARE

Mode of Action for Yeast Probiotics

Actisaf Action on Rumen Ecosystem Balance

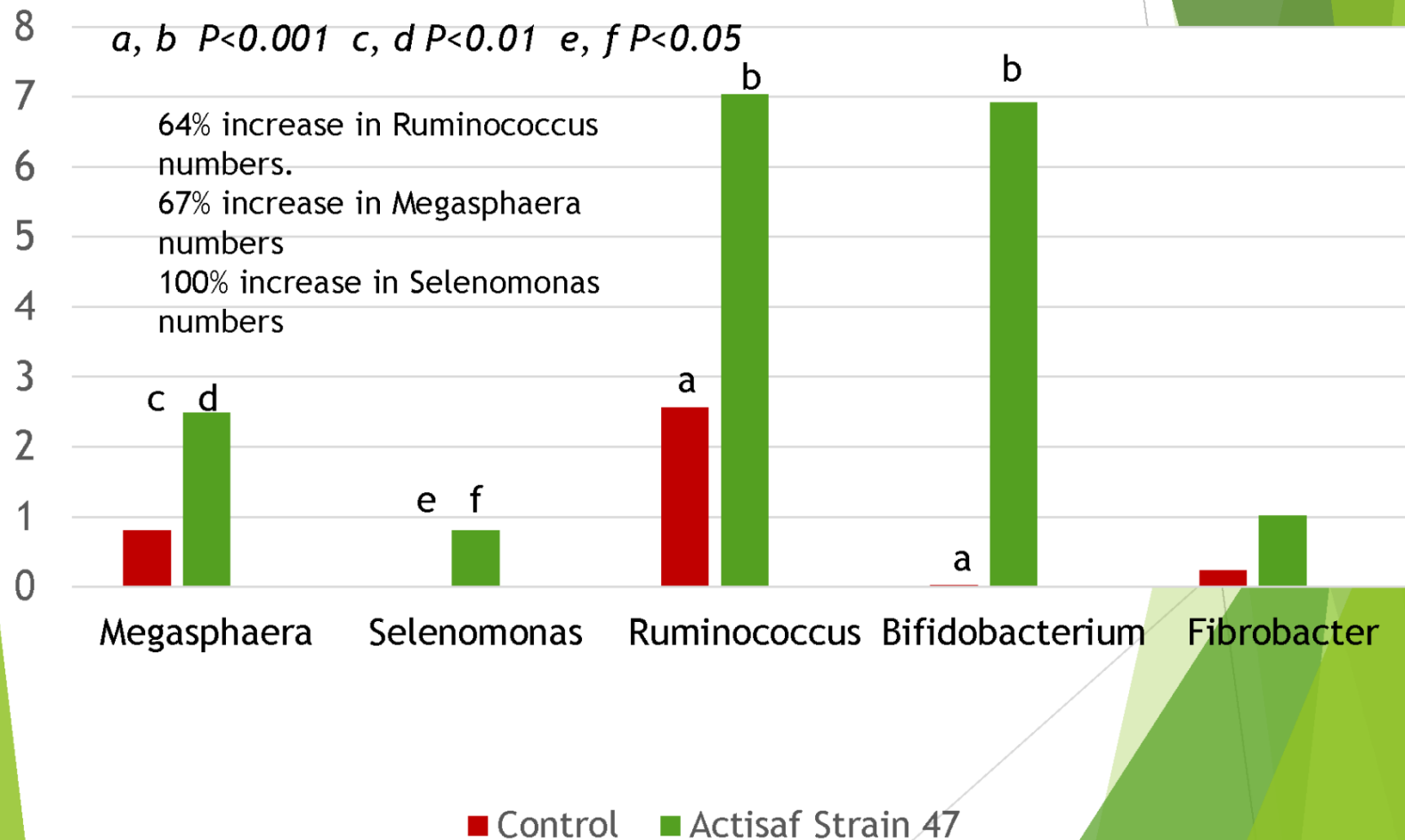


➡ **Reduced risk of acidosis**

➡ **Increased digestibility**

Impact of Actisaf Strain 47 on Microbial Species in the Rumen, % of Total Bacterial DNA

Pinloche et. al., 2013 Plos one 8(7) e6784



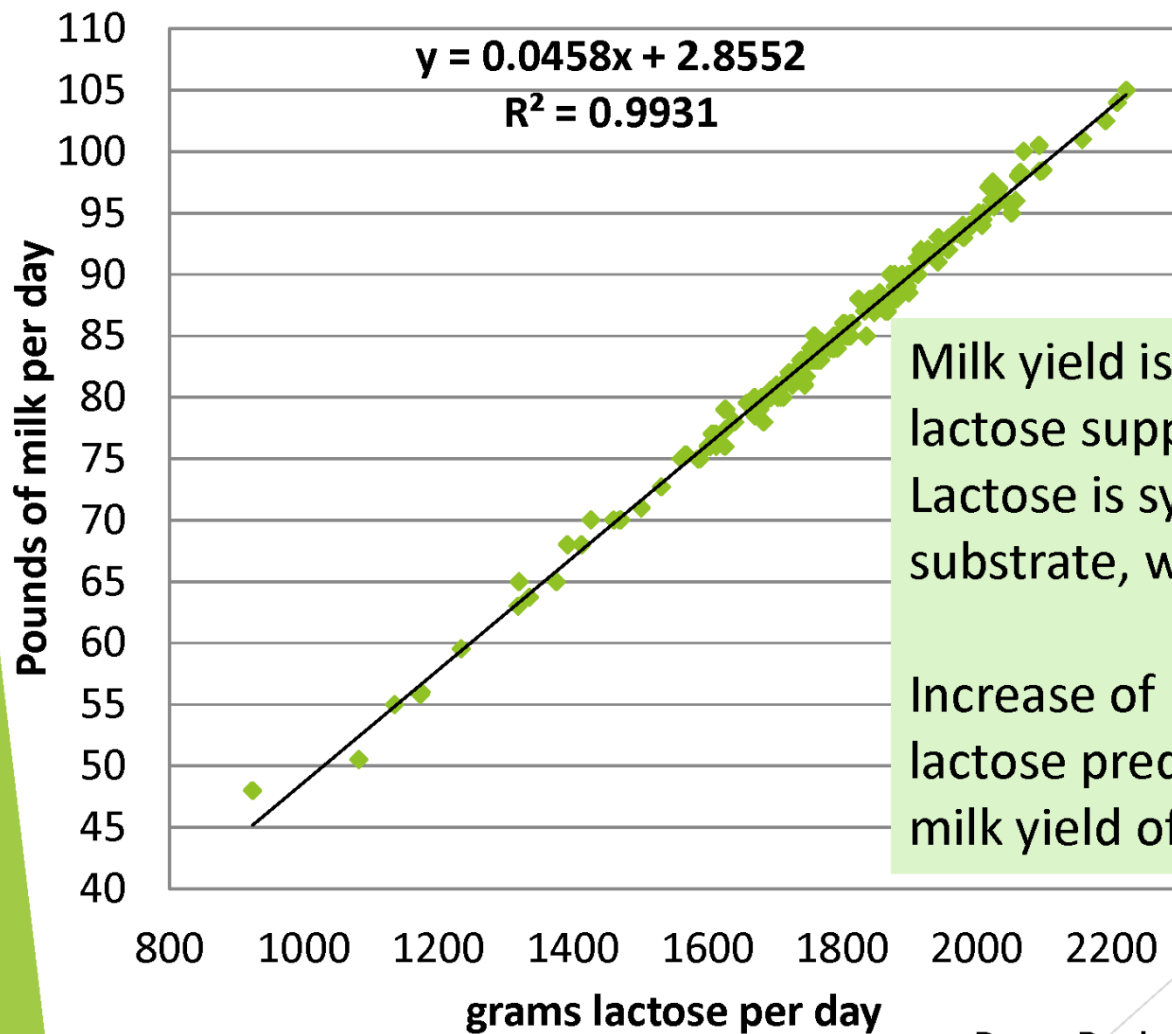
Mode of Action of Yeast Probiotics

- Actisaf increase feed conversion and VFA production in rumen
 - This leads to **higher glucose synthesis from the liver**



An increase of blood glucose during heat stress benefits milk production

Relationship Between Lactose Yield, g/d and Milk Yield, lbs./day



Milk yield is a function of lactose supply.
Lactose is synthesized from one substrate, which is glucose.

Increase of 170 grams of lactose predicts an increase in milk yield of 7.8 pounds

Dave Barbano data set

Return on Investment (ROI)

- ▶ Inputs: Actisaf SC 47, 5 grams = 5 cents
- ▶ 4.8 lbs. more DMI = 48 cents
- ▶ Total inputs = 53 cents

- ▶ Output = 7.8 lbs. milk.
- ▶ Milk Price = \$16.00/CWT.
- ▶ Output, \$ = 1.25
- ▶ ROI = $(1.25/0.53) = 2.4:1$
- ▶ Net revenue/Cow = \$0.72/day

Economic Value of Improved Fiber Digestion

More Dry Matter Intake
More Milk Components

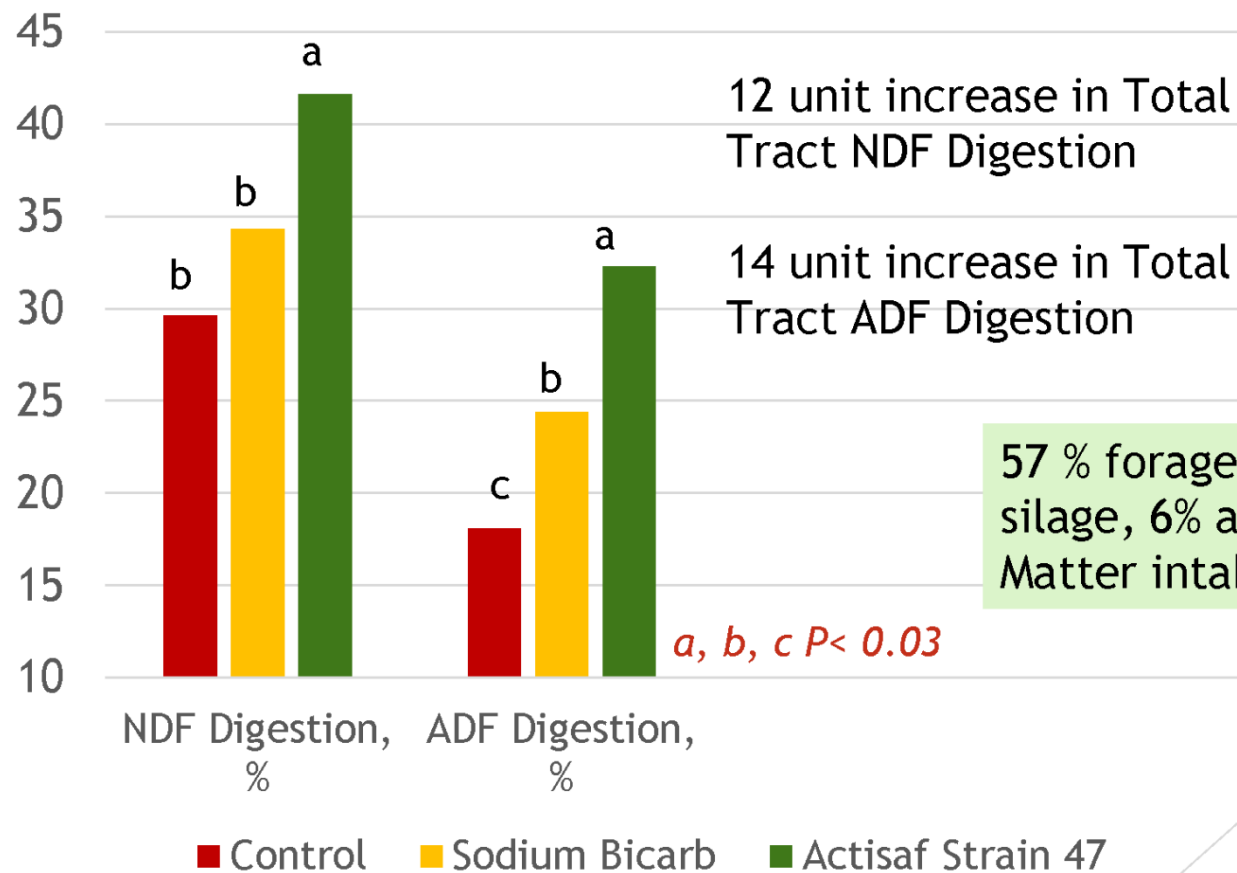


Impact of the Yeast Probiotic, Actisaf Strain 47 on Fiber Digestion

**Early Lactation Cows
producing 45 kg (100 lbs.)
of Milk**

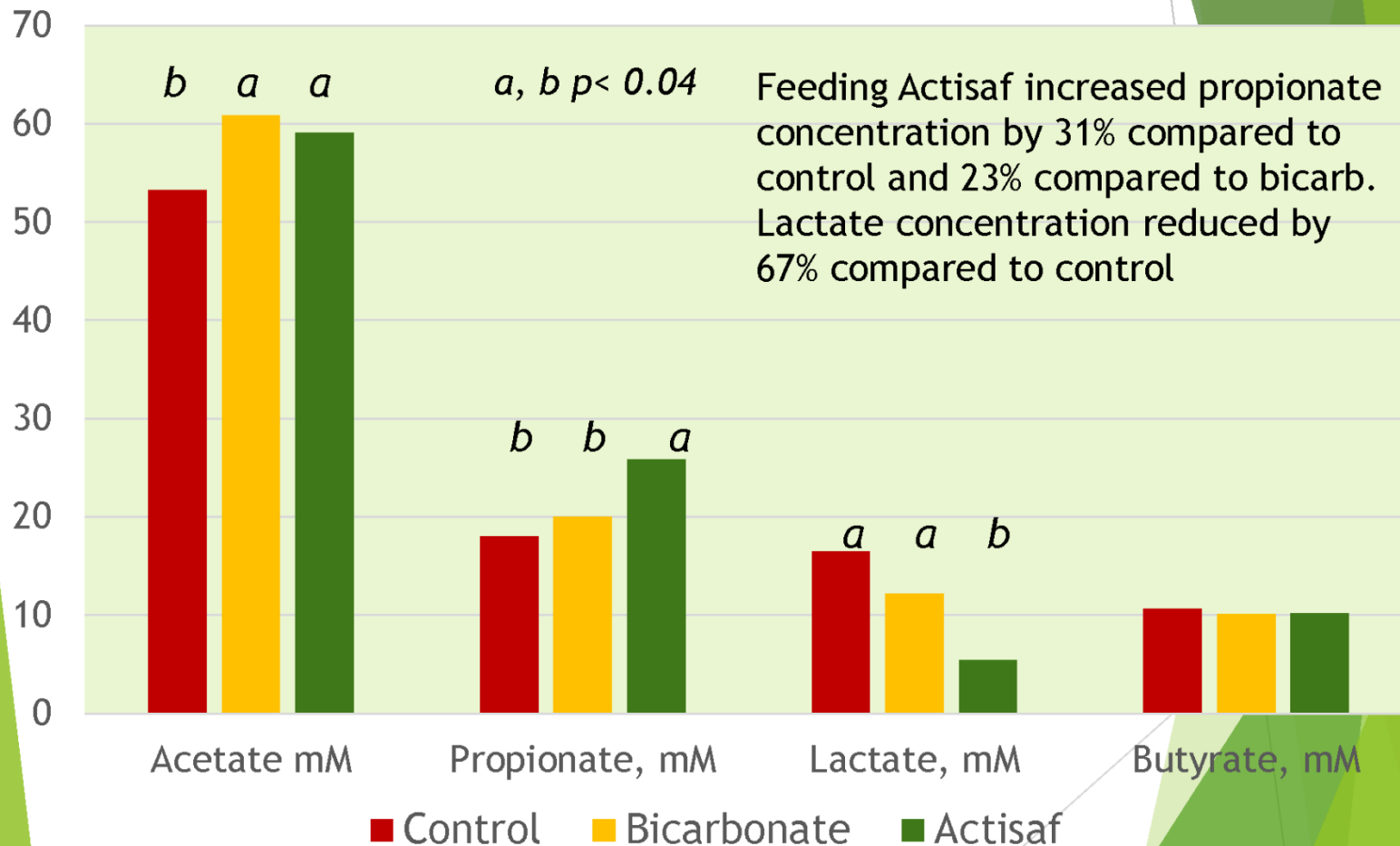


Impact of Actisaf strain 47 on Total Tract NDF and ADF digestion.



Source: J. Dairy Science Vol. 191, #9, 2008.

Impact of Actisaf strain 47 on Rumen VFA Concentration



Source: J. Dairy Science Vol. 191, #9, 2008.

Each one unit increase in NDF digestibility increases dry matter intake by 0.17 kg

- ▶ 12 unit increase in NDF Digestion
- ▶ 2 kg or 4.4 pound increase in DMI.
- ▶ Inputs - 5 grams Actisaf SC 47 = 5 cents
- ▶ Inputs - 4.4 lbs. DMI = 44 cents
- ▶ Total Inputs = 49 cents
- ▶ Outputs - 3 kg (6.6 lbs.) 4% FCM
- ▶ 6.6 lbs. x \$16.00/CWT. = \$1.06
- ▶ ROI = $(1.06/49) = 2.2:1$
- ▶ Net revenue/Cow = $(1.06-0.49) = \$0.57$

Impact of Yeast Probiotic (Actisaf strain 47) on Performance of Lactating Cows

Journal of Dairy Science (2009). 92:343-351

21 Holstein cows per Treatment

114 DIM \pm 54

Trial conducted mid-July through mid-Oct.in Israel.

Cows cooled 5 times per day, 30 minutes of cooling each session.

Individual cow feed intake with milk yield and composition.(Afimilk)

90 day trial

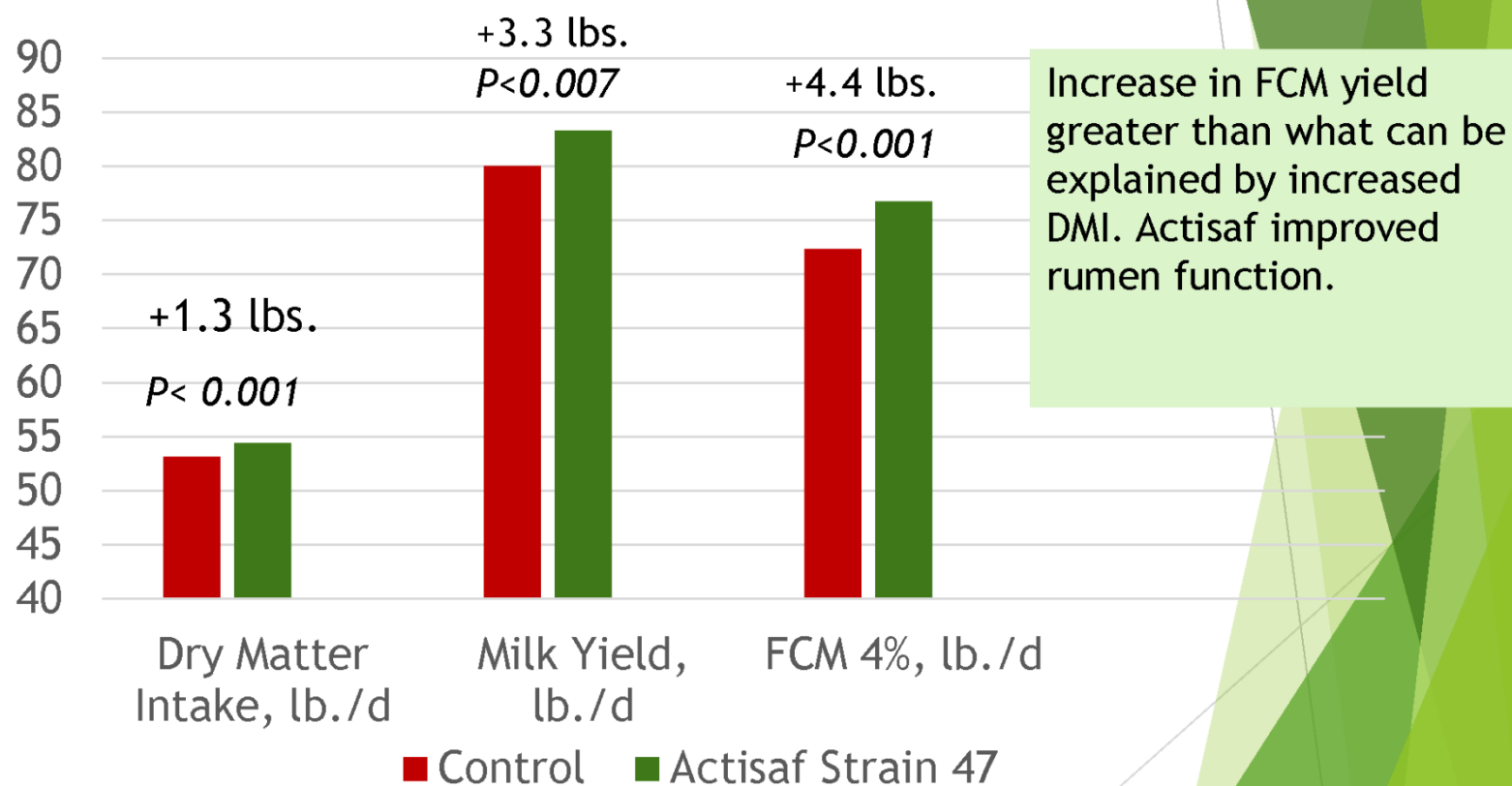
Cows housed in shaded lots with access to unshaded area.

Experimental Treatments and Diets

- ▶ Cows fed a TMR once daily.
- ▶ Yeast Probiotic mixed into 100 grams of ground corn and mixed into TMR.
- ▶ 2 treatments, control and Actisaf (6 grams/cow/day)

Chemical Composition of TMR	
NEL, mcal/lb. DM	0.79
Crude Protein, % DM	16.50
Forage NDF, % DM	17.2
NDF, % DM	31.7
ADF, % DM	16.1
RDP, % DM	11.4
RUP, % DM	5.1

Impact of Yeast Probiotic on Dry Matter Intake and Milk Yield



Impact of Yeast Probiotic (Actisaf strain 47) on Milk Composition

Variable	Control	Actisaf (SC 47)	P value
Milk Fat, %	3.47	3.63	0.15
Milk Protein, %	3.20	3.24	NS
Milk Lactose, %	4.86	4.91	0.02
Milk Fat Yield, lb./cow	2.80	3.00	0.03
Milk Protein Yield, lb./cow	2.58	2.69	0.12 (trend up)
Lactose Yield, grams/cow	1811	1889	0.15
FCM 4% / kg. DMI	1.36	1.41	0.03

Greater lactose percent with greater lactose yield on yeast probiotic treatment indicates that more glucose was reaching the mammary gland.

Yeast Probiotics (Actisaf): Economic Analysis

Show Me the Money !!!

INPUTS	Cost/Cow
Actisaf 5 grams/cow	5 cents
Additional Dry Matter Intake (+1.3 lbs. at 10 cents/lb.)	13 cents
Total Inputs	18 cents
Outputs	
0.20 lb. of additional milk fat \$2.53/lb.	51 cents
0.11 lb. of additional milk protein, \$1.36/lb.	15 cents
ROI (66/18)	3.7:1
Net revenue/cow, \$ (0.66-0.18)	0.48

Easy way to cover the cost of the Actisaf.

Option 1: replace Diamond V yeast culture with 5 grams of Actisaf.

Option 2: replace 0.33 pounds of bicarb with 5 grams of Actisaf.

Impact of Yeast Probiotic (Actisaf strain 47) on Performance of Lactating Cows

United Kingdom Trial

80 Holstein Cows per Treatment
Control or Actisaf SC 47

Actisaf SC 47 - 4.9 grams/cow

Dry Matter Intake on Control Diet = 48.5 lbs.

47% forage diet.

26% Corn silage, 15% Grass silage, 5.5% chopped straw

23% Starch + Sugars

Impact of Actisaf SC 47 on Milk Yield and Milk Components.

	Control	Actisaf	SEM	P Value
Milk Yield, lbs.	84.8	89.0	1.02	<0.05
Fat, %	3.67	3.87	0.17	NS
Fat Yield, lbs.	3.11	3.44		
Protein, %	3.11	3.15	0.27	NS
Protein Yield, lbs.	2.64	2.80		
Total Fat + Protein, lbs.	5.75	6.24		

Yeast Probiotics (Actisaf): Economic Analysis

Show Me the Money !!!

INPUTS	Cost/Cow
Actisaf 5 grams/cow	5 cents
Additional Dry Matter Intake (+2.5 lbs. at 10 cents/lb.)	25 cents
Total Inputs	30 cents
Outputs	
0.33 lb. of additional milk fat \$2.53/lb.	83.5 cents
0.16 lb. of additional milk protein, \$1.36/lb.	21.8 cents
ROI (1.05/0.30)	3.5:1
Net revenue/cow, \$ (1.05 -0.30)	0.75

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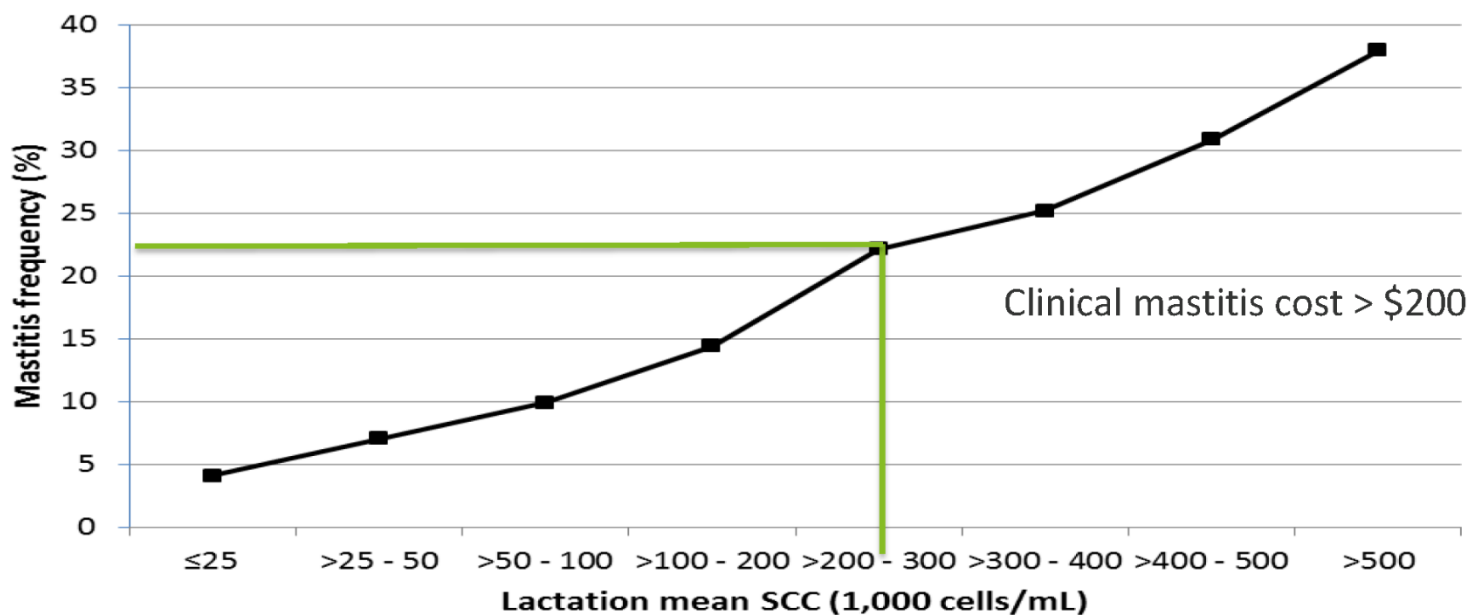
Somatic Cell Counts and Milk Economics





SCC economic impact

- $\text{SCC} \geq 200\,000$ = subclinical mastitis
 - High risk of clinical mastitis

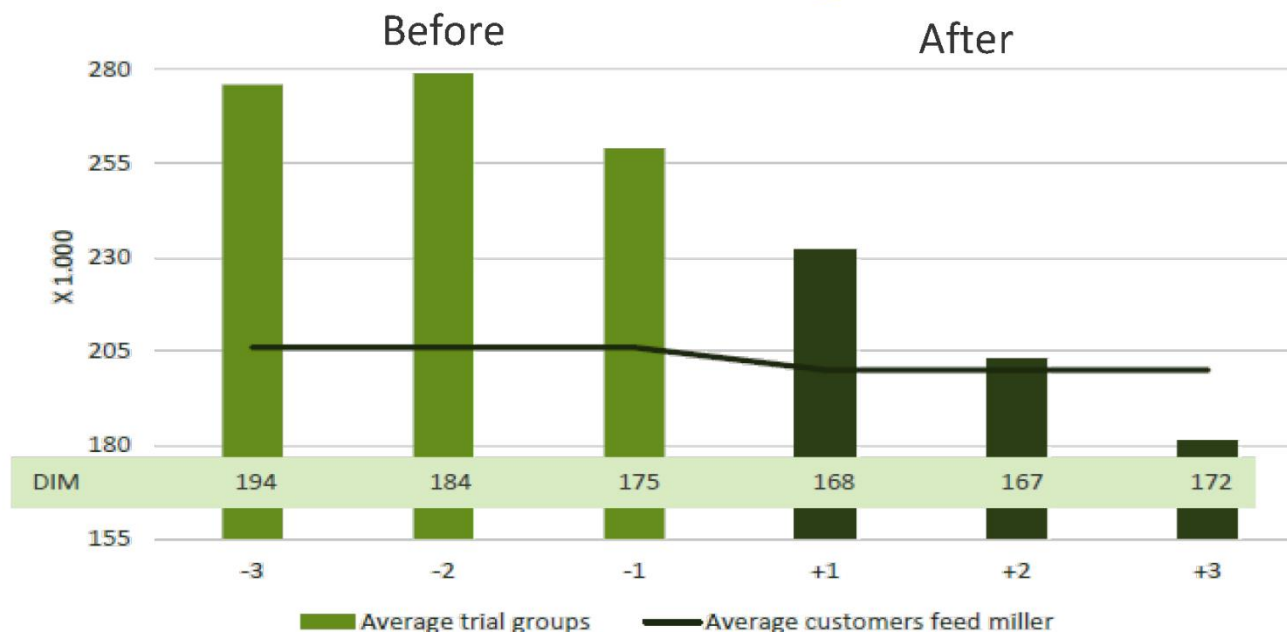


Association between lactation mean somatic cell count (5 to 305 DIM) and mastitis frequency.

*A. Koeck et. Al. University of Guelph.



Safmannan – Health through Nutrition



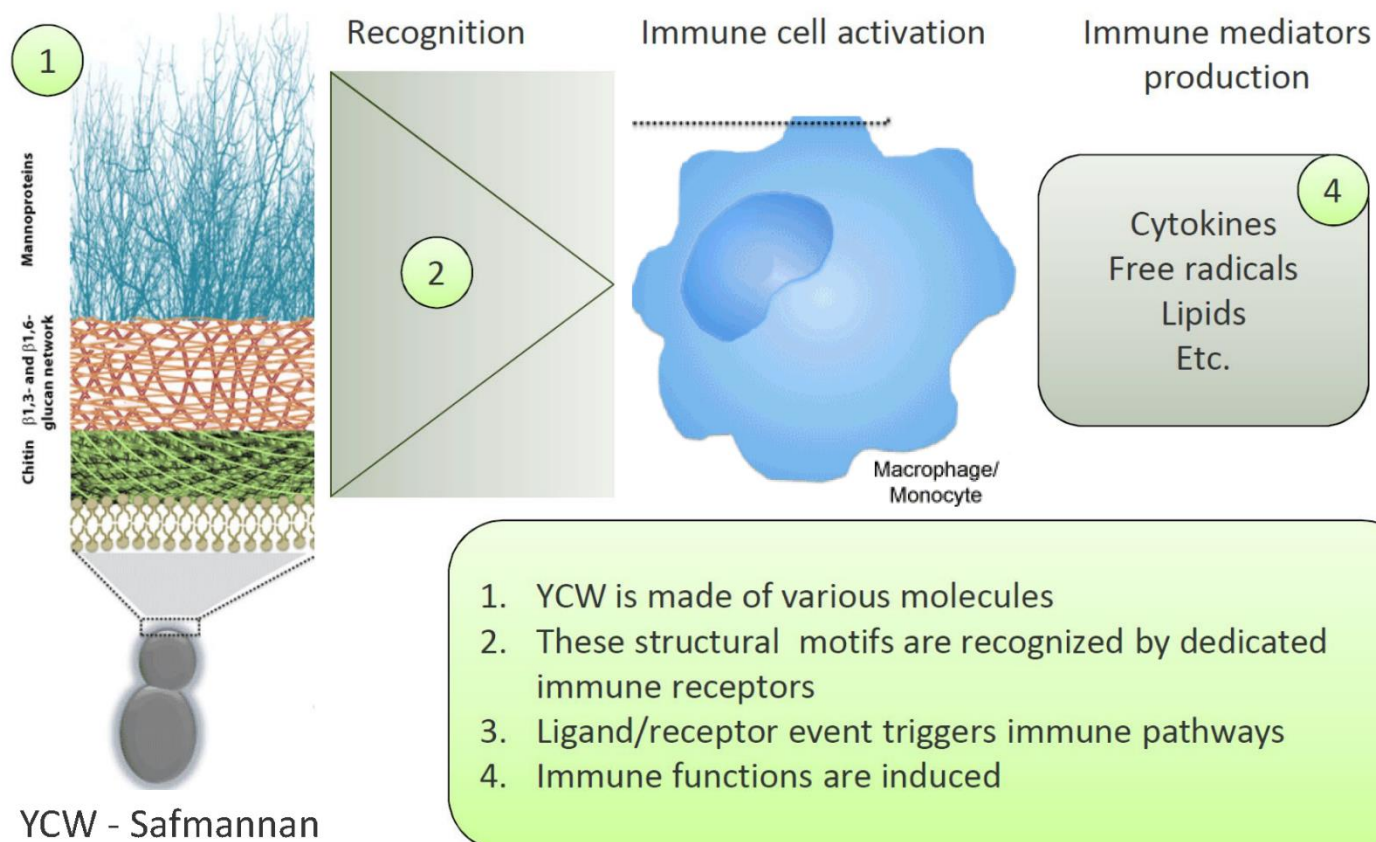
	Before Safmannan supplementation	After Safmannan supplementation	Difference in %
Average trial groups	271	205	- 23.7 %

Field trial, The Netherlands, 8 dairy farms. 2015.

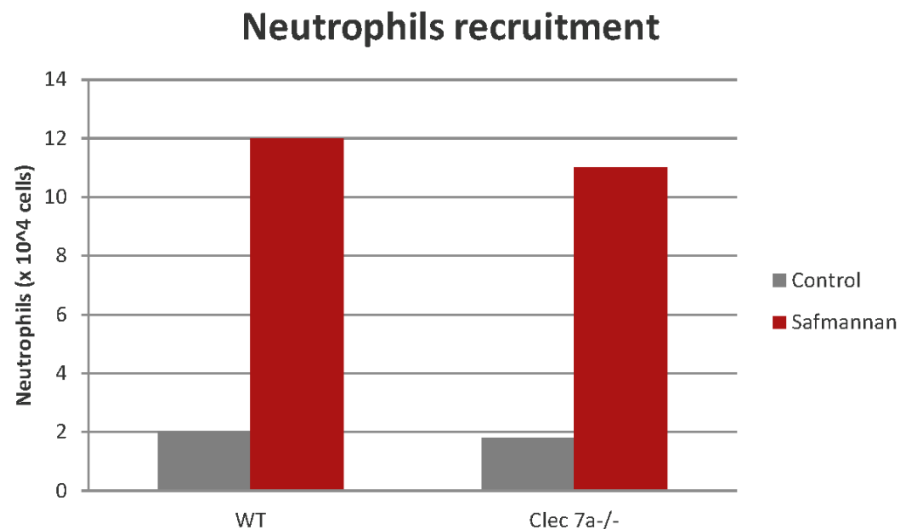
Actisaf dose - 5g/c/d

Safmannan dose – 10g/c/d

Safmannan – Health through Nutrition

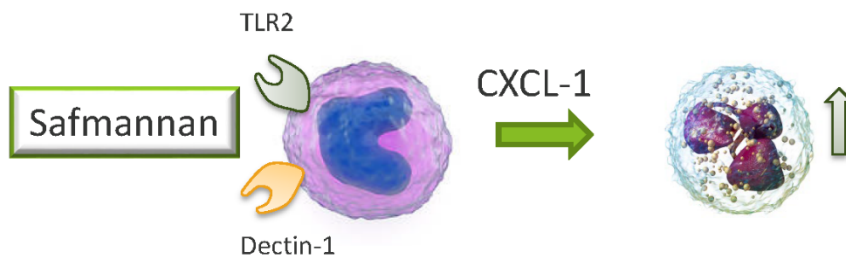


Activation of the Neutrophils



In-vitro experiment using two different cell cultures.

Safmannan demonstrates high capacity to activate the neutrophils.



• **Safmannan** triggers early neutrophils recruitment

Economic Impact of Reducing SCC using Safmannan

Variable	Before Safmannan (10 grams/cow/d)	After Safmannan (10 grams/cow)
SCC	271,000	180,000
Incidence of Mastitis, %	23.0	15.0
Cases per 100 cows	23	15
Cost, \$ per Mastitis case	315.00	315.00
Cost of Mastitis /100 cows, \$	7,245	4,725
Cost, \$ to Feed Safmannan 21-d pre-fresh through 150 DIM per 100 cows		855.00
ROI (2520/855)		2.95:1

The Big Takeaways

**ROI on the use of Yeast Probiotics
Depends on How You Measure it.**

**When You account for the increase
in DMI, ROI = 2.2 to 3.7:1**

**At Current Prices, Net Revenue is 48
to 75 cents per cow/day.**

**Can Lower Diet Cost When Used to
replace yeast culture or part of the
buffer in the diet.**

Thank you!

