

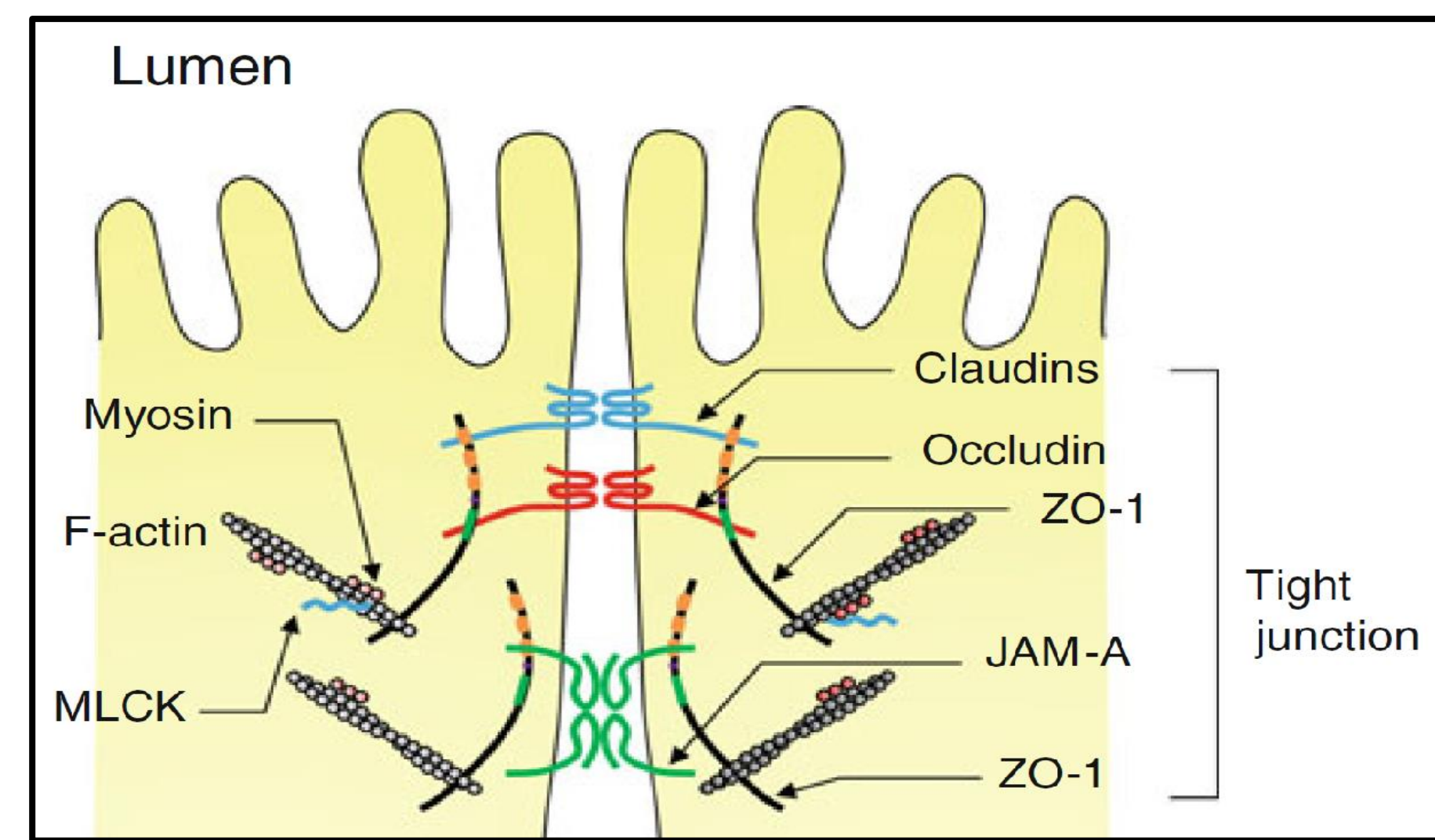
# Effect of live yeast *Saccharomyces cerevisiae* (ActiSaf HR+) on postweaning performance, diarrhea and immune parameters with an environmental challenge

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## Introduction

As a result of exposure to several stressors and pathogens during weaning, piglets are susceptible to intestinal barrier inflammation<sup>1</sup>. The tight junctions that control the movement of molecules in and out of intestinal epithelial cells can become damaged, which stunts growth and development of the animal and leads to diarrheal diseases<sup>2</sup>. Previous research has demonstrated the preventative and therapeutic effects of live yeast *Saccharomyces spp.* in nursery trials<sup>3</sup>. Supplemental dietary probiotics show potential to serve as an alternative for antibiotics currently used in the swine industry.

### Tight Junction Proteins between Epithelial Cells



Adapted from Suzuki, 2013

## Objectives

To determine if the daily administration of dietary live yeast, *Saccharomyces cerevisiae*, will provide an effective alternative to antibiotics currently used to treat diarrheal diseases as well as improve weight gain and growth performance in different farm management systems.



## Methods

- 260 weaned piglets (~18-21 d old, initial BW (body weight) = 6.68 ± 0.67 kg) were weighed at weaning
- Piglets were sorted such that treatment was balanced for litter origin, weight, and sex
- Piglets were housed in environmentally controlled nursery rooms with *ad libitum* access to feed and water at all times
- Piglets were allotted to one of four treatments in a 2 x 2 factorial arrangement
  1. Control diet, clean environment
  2. ActiSaf HR+ diet, clean environment
  3. Control diet, dirty environment
  4. ActiSaf HR+ diet, dirty environment
- Piglets were kept in 52 pens, with 5 piglets per pen, and 13 pens per treatment
- Piglets were fed a 3-phase feeding program
  - Phase 1: d 1 to 7
  - Phase 2: d 7 to 21
  - Phase 3: d 21 to 35
- Yeast supplementation was added to diets at 0.1% in phase 1 and 2, and 0.05% in phase 3
- Feed and performance data were collected on days 0, 7, 14, 21, and 35
- Pen fecal scores were collected on days 0, 7, 14, 21, and 35
  - Fecal scores were based on a scoring system (0, dry, hard, well-formed feces; 1, soft, but formed feces; 2, pasty feces green or brown in color; 3, viscous feces light in color, episodic; 4, fluid feces in light color; 5, watery feces, continuous)

## Statistical Analysis

- Individual pens served as the experimental unit
- Growth data, weight and fecal score measures were analyzed as a 2 x 2 factorial arrangement in a randomized block design with repeated measures in time using the PROC MIXED procedure of SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

## Results

### Growth and Performance Data

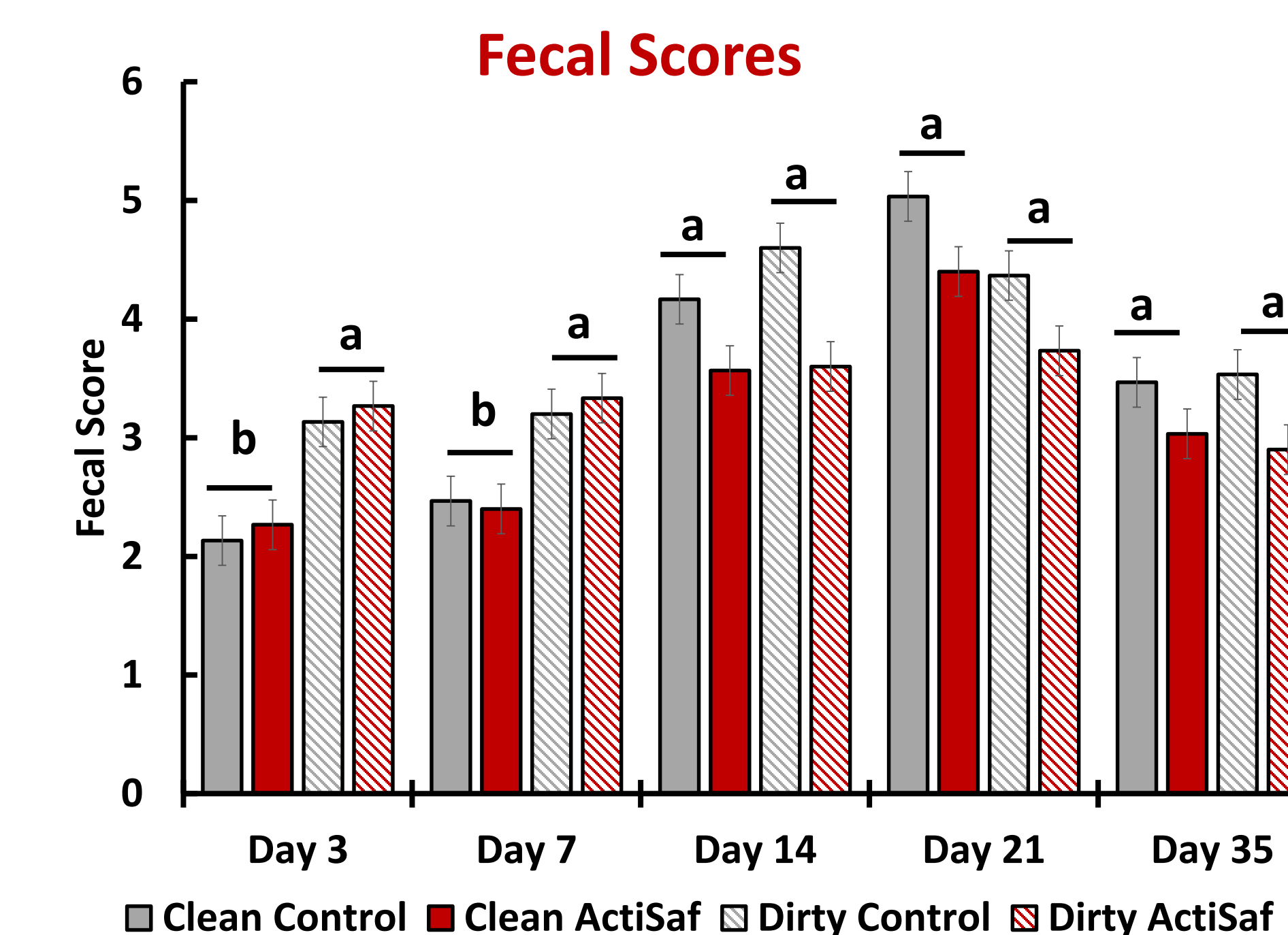
Environment	Clean		Dirty		SEM	P values						
	Diet	Control	ActiSaf	Control		ActiSaf	Diet	Environ.	Phase	Diet*Environ	Diet*Phase	Environ*Phase
<b>ADFI, g</b>						0.123	0.081	< 0.0001	0.531	0.161	0.072	0.510
<b>d 1 to 7</b>	257.67	253.96	232.39	236.12	33.3							
<b>d 7 to 21</b>	541.99	587.51	539.10	567.91	33.3							
<b>d 21 to 35</b>	978.47	1095.80	923.51	958.88	33.3							
<b>d 1 to 35</b>	659.18	697.05	629.11	663.31	24.6	0.154	0.206		0.941			
<b>ADG, g</b>						0.424	0.035	< 0.0001	0.190	0.489	0.528	0.809
<b>d 1 to 7</b>	220.35	81.99	6.34	26.15	58.7							
<b>d 7 to 21</b>	436.59	332.15	322.68	314.97	58.7							
<b>d 21 to 35</b>	624.96	611.42	531.07	582.81	58.7							
<b>d 1 to 35</b>	375.56	391.81	337.70	365.13	12.6	0.089	0.013		0.658			
<b>F:G, g/g</b>						0.387	0.067	0.798	0.230	0.406	0.051	0.168
<b>d 1 to 7</b>	1.95	11.11	-0.08	-1.62	2.3							
<b>d 7 to 21</b>	2.47	1.88	1.75	1.97	2.3							
<b>d 21 to 35</b>	1.76	1.83	1.79	1.68	2.3							
<b>d 1 to 35</b>	1.75	1.77	1.90	1.84	0.06	0.732	0.094		0.502			

- Pigs fed ActiSaf HR+ had greater ADG (average daily gain) compared to control fed pigs regardless of environment
- Pigs reared in the dirty environment vs the clean environment had reduced overall ADG
- Pigs raised in the dirty environment had an overall greater F:G (feed to gain) ratio compared to pigs raised in clean environments

### Pen Weights (kg)

Environment	Clean		Dirty		SEM	P values						
	Diet	Control	ActiSaf	Control		ActiSaf	Diet	Environ.	Phase	Diet*Environ	Diet*Phase	Environ*Phase
<b>Pen Weight, kg</b>						0.668	0.406	< .0001	0.692	0.018	0.012	0.358
<b>Day 1</b>	33.33	33.39	33.45	33.43	2.26							
<b>Day 7</b>	41.04	36.25	34.02	34.26	2.26							
<b>Day 14</b>	43.37	44.09	42.33	46.35	2.26							
<b>Day 21</b>	58.11	59.35	57.3	57.23	2.26							
<b>Day 35</b>	98.93	102.01	95.35	99.46	2.26							

- Final pen weights at d35 were greater in ActiSaf HR+ vs. control fed pigs



- Diarrhea scores were increased in the dirty environment compared to the clean environment on days 3 and 7 (P < 0.01)

## Conclusions

- ActiSaf HR+ increased overall ADG in regardless of environment and environmental challenge reduced growth and efficiency parameters in the nursery pigs
- Clean environment can decrease additional stress and disease factors on pigs at weaning

### Bibliography

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<sup>2</sup> Bisklager, AT, AJ Moeser, JL Gookin, SJ Jones, and J Odle. "Restoration of Barrier Function in Injured Intestinal Mucosa." *Physiological Reviews*. 87.2 (2007): 545-64. Print.  
<sup>3</sup> Trčkova M, Faldyna M, Alesh P, Srnambkova Z, Gajfert E, Komprechtova D, Audair E, D'Inca R. The effects of live yeast *Saccharomyces cerevisiae* on postweaning diarrhea, immune response, and growth performance in weaned piglets. *J Anim Sci*. 2014 Feb; 92(2): 767-74. doi: 10.2527/jas.2013-6793. E pub 2013 Dec 4.