ActiSaf Sc 47 HR+

NEW GENERATION

Premium live yeast probiotic for long-term benefit.

Phileo by Lesaffre

What is "YEAST"

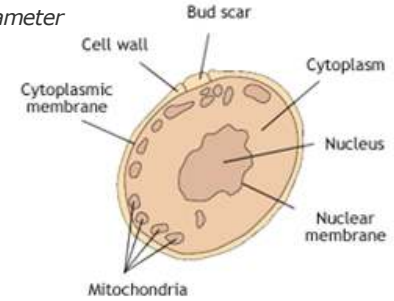


Diagram of a yeast cell (diameter = 8 microns)

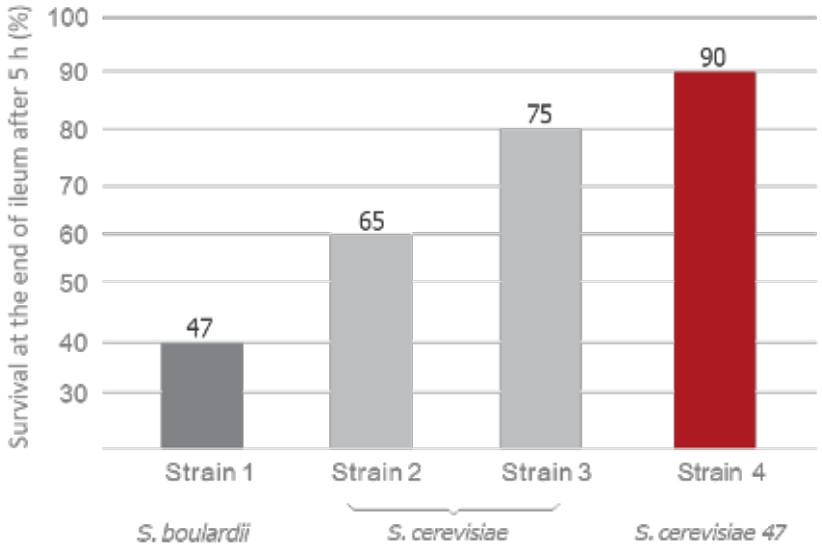
- Yeast is a naturally occurring fungi.
  - The most common yeast is *Saccharomyces cerevisiae*.
    - Over 1,500 variants exist of *S. cerevisiae* exist.
- Lesaffre has cataloged >9,000 yeast variants.
  - Multiple *S. cerevisiae* variants along with other families and variants.
  - "Strains that are closely related genetically may behave quite differently…" (http://allaboutbeer.com/article/the-family-tree-of-yeast/)
- Phileo works with several specific strains, depending upon application.
  - Strains are tested for efficacy for different applications.
    - Live yeast probiotic, yeast extracts, selenium yeast, inactive yeast.
  - <u>Resistance to degradation and efficacy in feed can vary widely.</u>

Phileo by Lesaffre

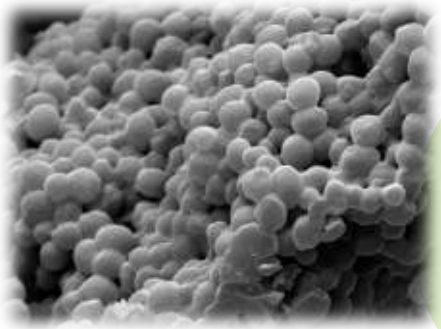
Select the right strain for bioavability

Probiotic *« live microorganisms which, when ingested in adequate amounts, interacts with microflora and confers a health benefits on its host »* WHO/FAO 2001

Comparison of the survival of different live yeast strains in the ileum (In Vitro model)

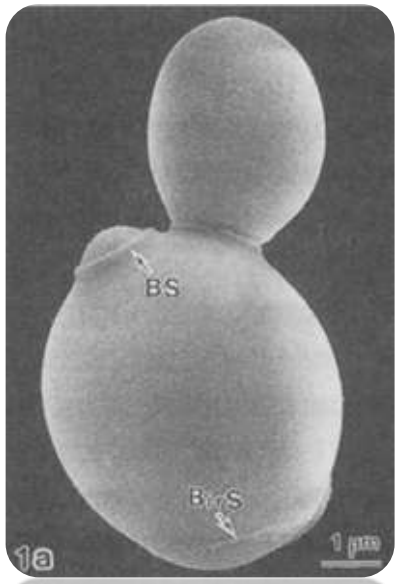


Internal research study, 2011



Phileo by Lesaffre

ActiSaf Sc 47 HR+ NEW GENERATION



- ✓ **Probiotic** manufactured by world's largest yeast supplier, Lesaffre
  - ✓ **Probiotic** - ***live microorganisms*** *that, when administered in adequate amounts, confer a* ***health*** *benefit on the host.* WHO/FAO 2001
- ✓ **Unique and DNA profiled strain** with documented benefits
- ✓ **Highly resistant** to feed manufacturing processes and proven survival in the digestive tract
- ✓ **Validated dosages** for good efficiency

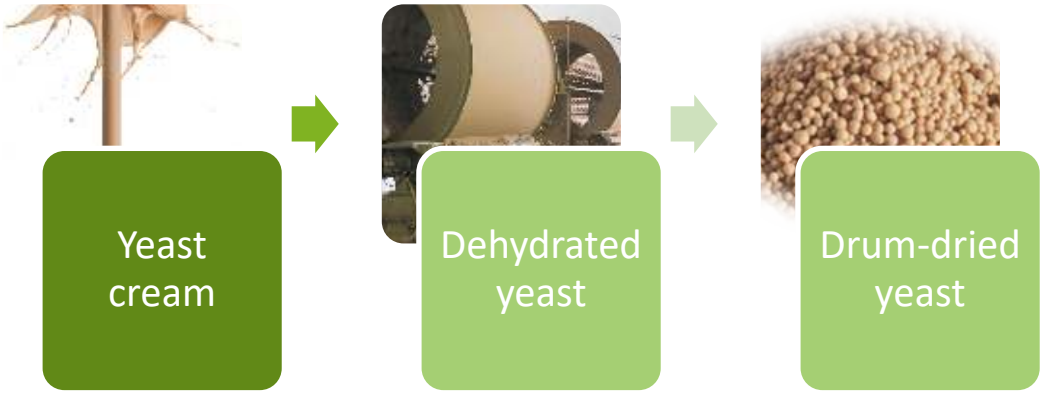
Phileo by Lesaffre

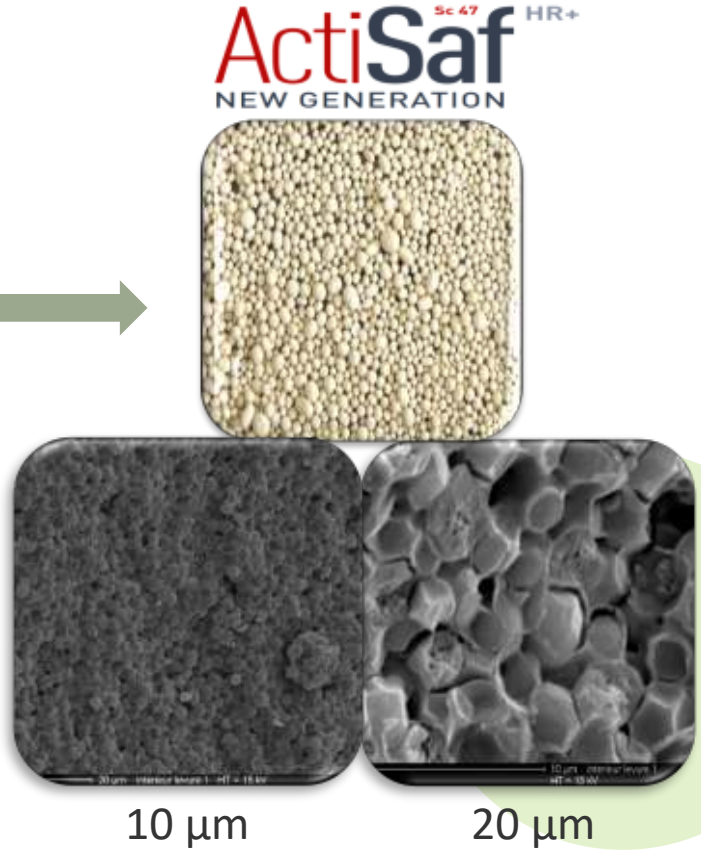
Actisaf® HR+ characteristics

- Actisaf is made of a specifically selected yeast strain: *Saccharomyces cerevisiae* Sc 47.
- Actisaf properties:
  - Eucaryote probiotic cell which does not colonize in the GI tract.
    - Requires continuous feeding; generally recognized as safe (GRAS)
  - Naturally resistant to antibiotics and sulfamids (nontransferable).
  - Naturally resistant to organic acid hydrolysis.
  - Naturally resistant to Na-metabisulfite degredation.
- Traceable proprietary strain:
  - identification and cfu count feasible anywhere in blending and feeding process.

Phileo by Lesaffre

Optimal stability without added coating



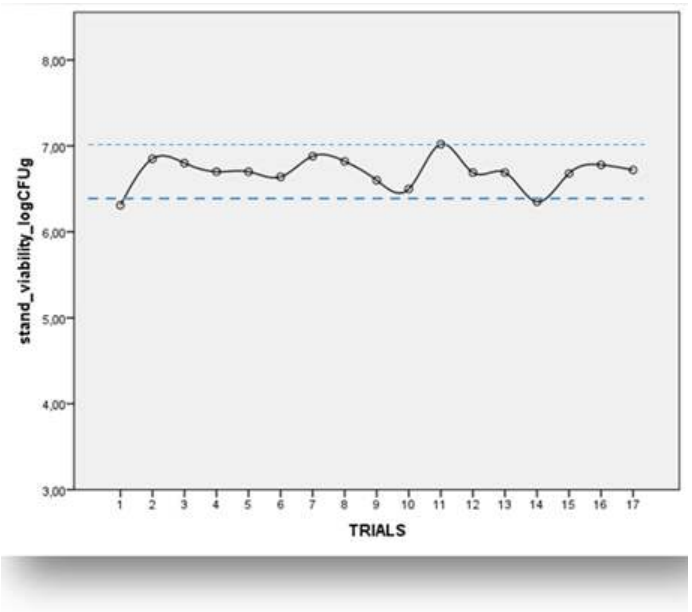


Actisaf® HR+ is made by a unique process ensuring:

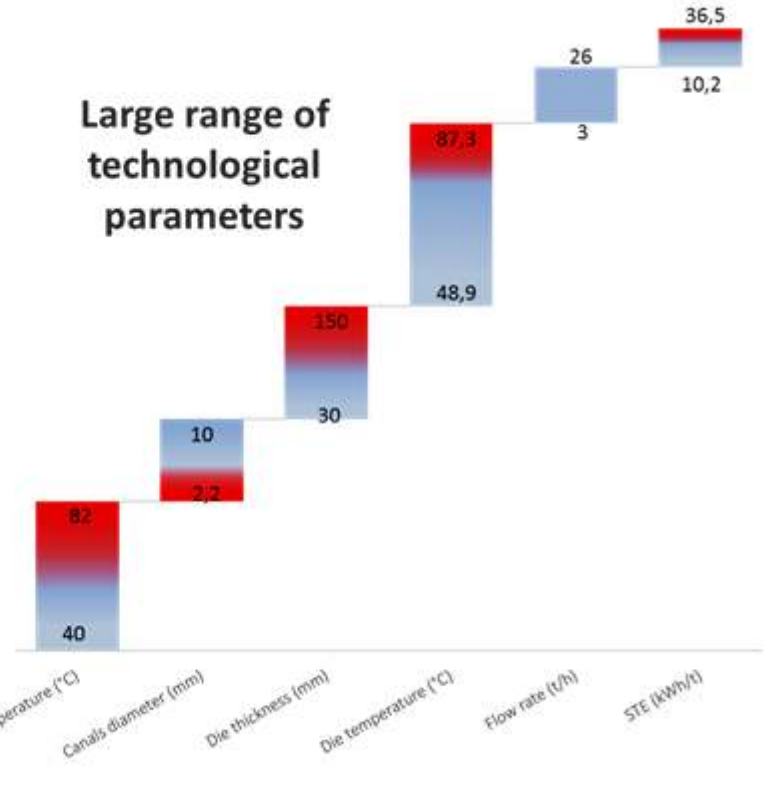
- Protection of the live yeast core from heat, shearing and moisture during pelleted feed manufacturing.
- In ≤ 1 hour, the ActiSaf® HR+ sphere dissolves in GI tract, providing equal live yeast probiotic value in meal and pelleted feeds.
- 6-month shelf life in concentrated vitamin-trace mineral premixes.
- Sustained resistance to damage by organic acids in premixes or complete feeds.

Phileo by Lesaffre

ActiSaf® HR+ value in various pelleted feeds.



Consistent resistance in various pelleted feeds



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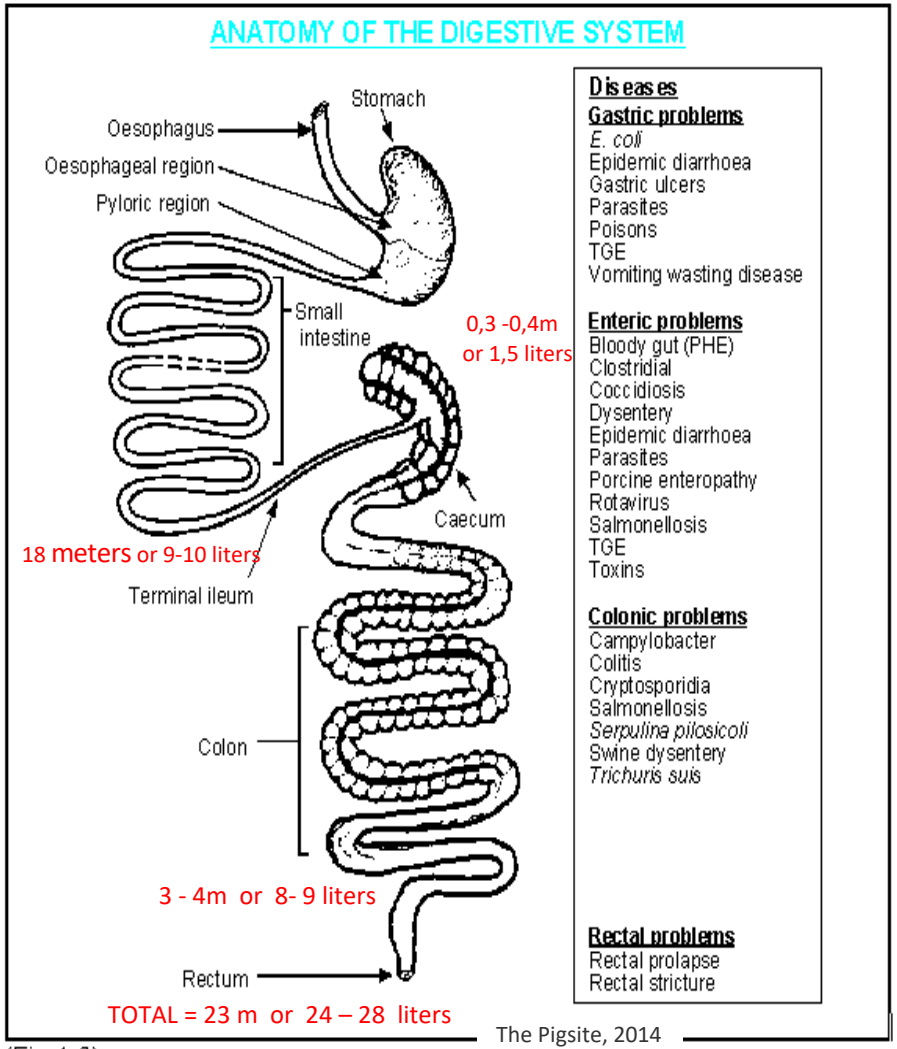
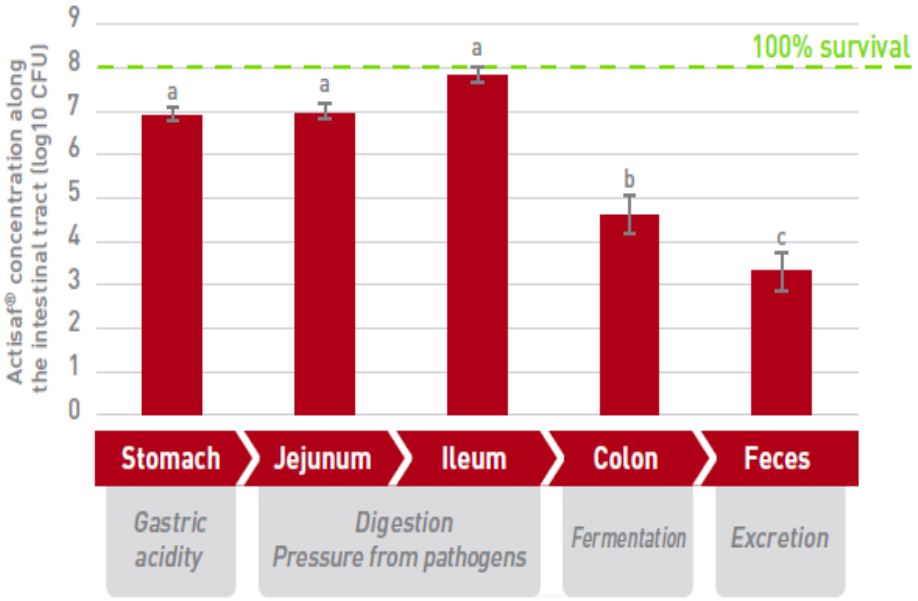
Enduring value in mash feeds.



The Pigsite, 2014

(Fig.1-2)

Live SC 47 yeast recovery (cfu/g) in the GI tract of weaned pigs after 5 days of ActiSaf HR+ in mash feed.



D'Inca *et al.*, 2015.

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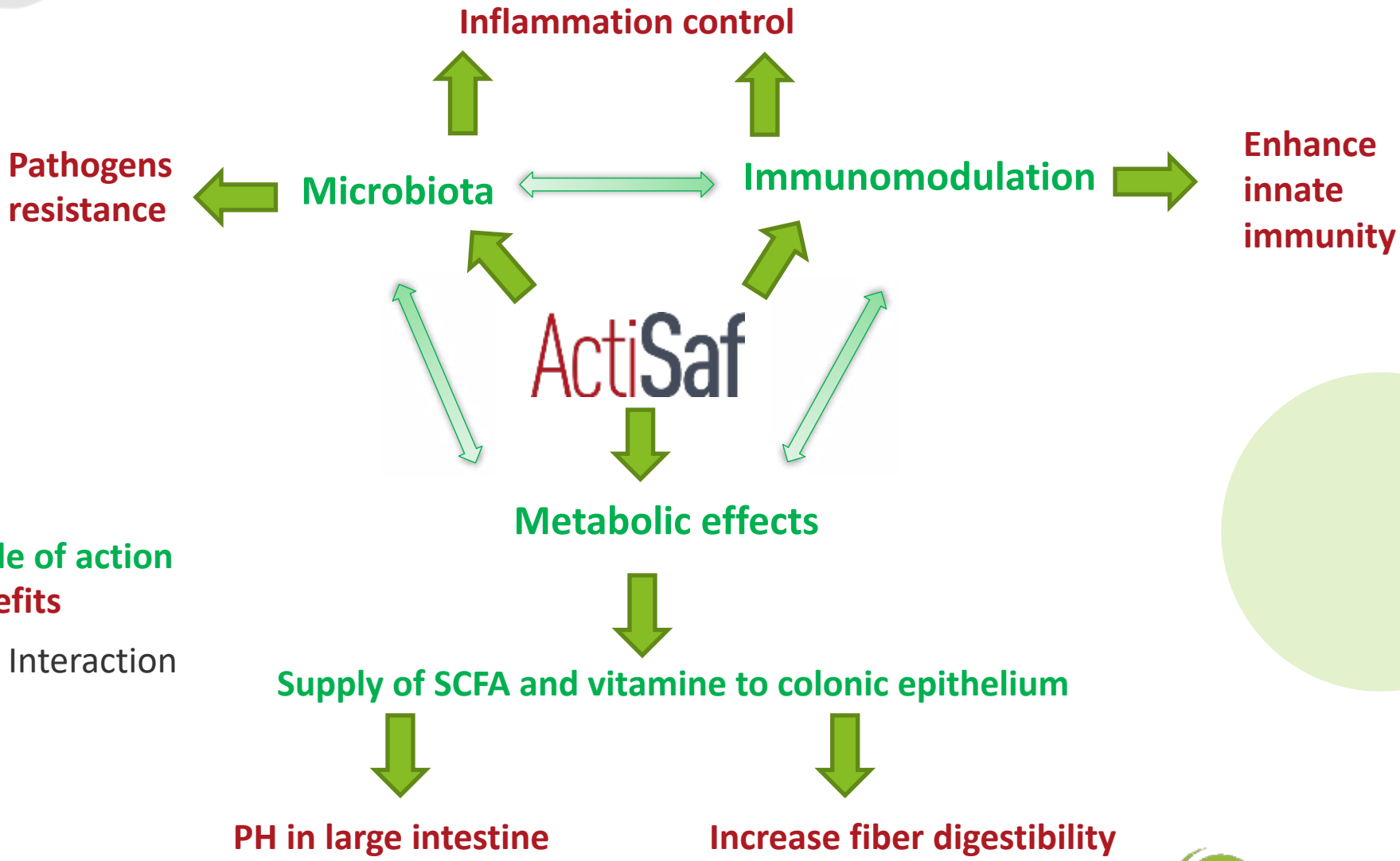
Functional Actions & Benefits



Mode of action
Benefits

⟺ Interaction

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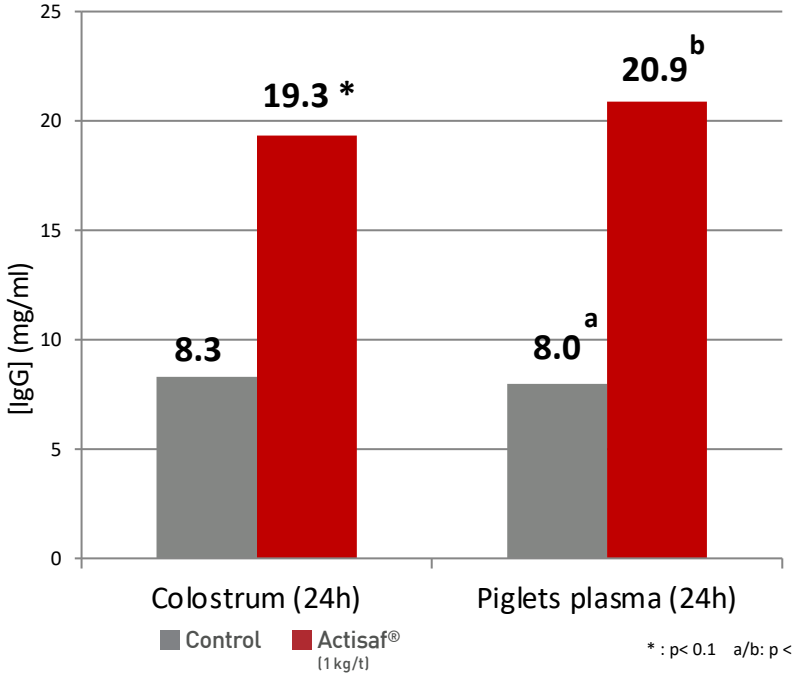
ActiSaf Sc 47 HR+
NEW GENERATION

Supporting Results

Phileo by Lesaffre

ActiSaf® HR+ helps immune transfer

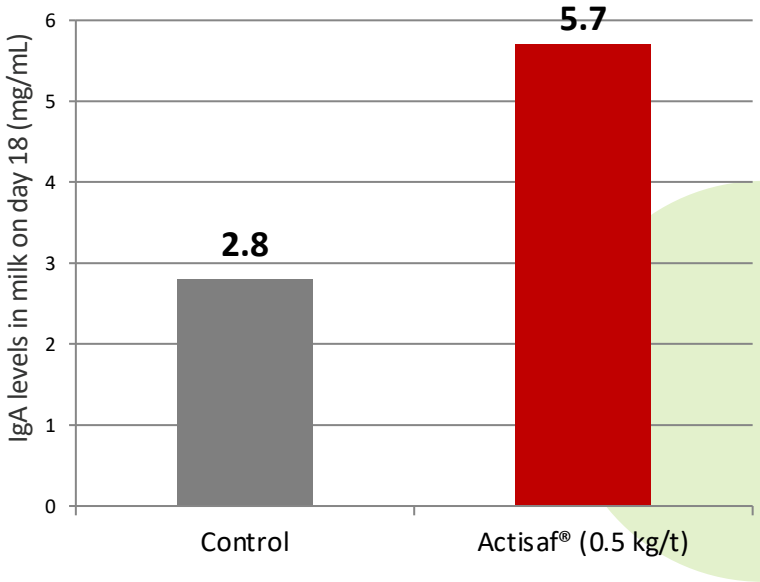
Effect of Actisaf® in sow gestation and lactation feed on IgG concentrations in colostrum and piglet plasma



* : p< 0.1 a/b: p < 0.02

Jang et al., 2013

Effect of Actisaf® in sow feed gestation and lactation on IgA concentration in milk



Zanello et al., 2013

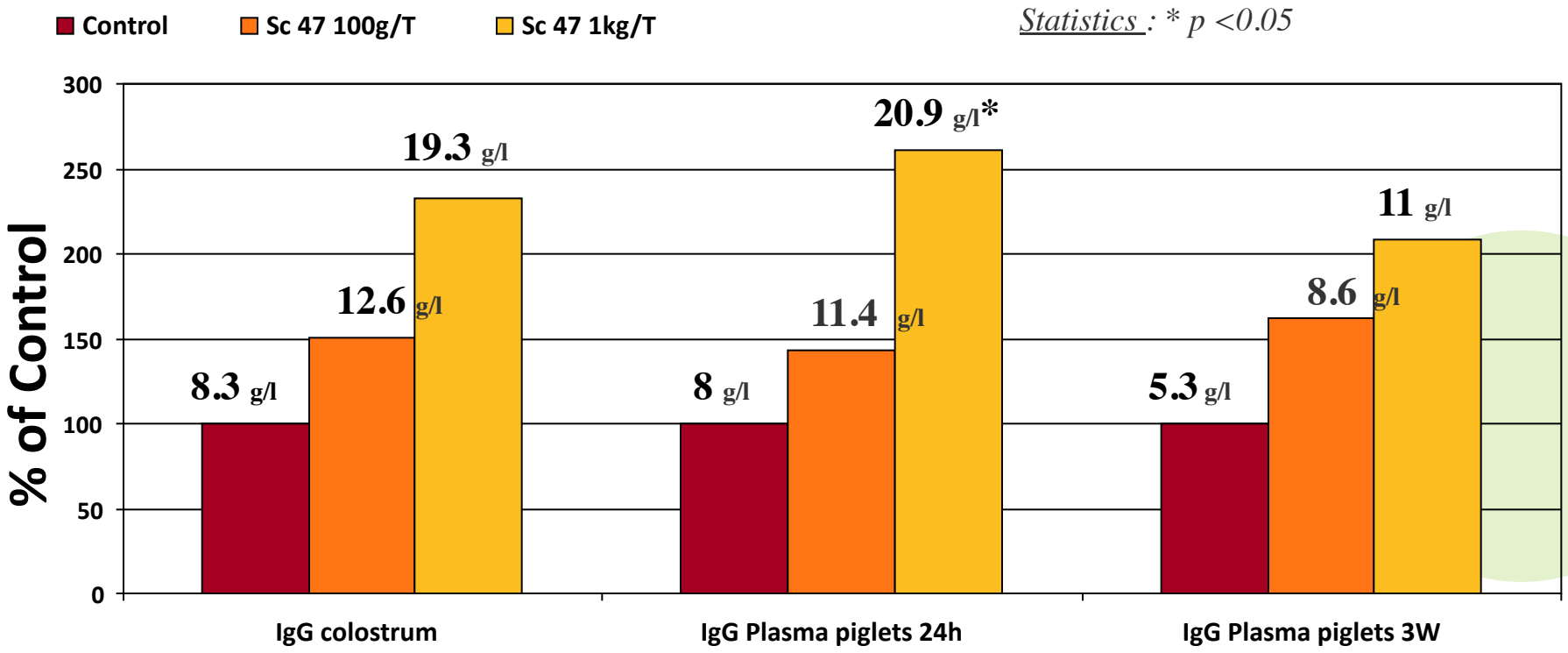
Actisaf® in sows: ↑ Passive immune transfer via colostrum

↑ Mucosal immunity

Effects on Sow Colostrum

Improve colostrum quality[1] (University of Seoul - 2010)

[1] Live Yeast (Sc47) included in gestation and lactation at either 100 g/T or 1 kg/T

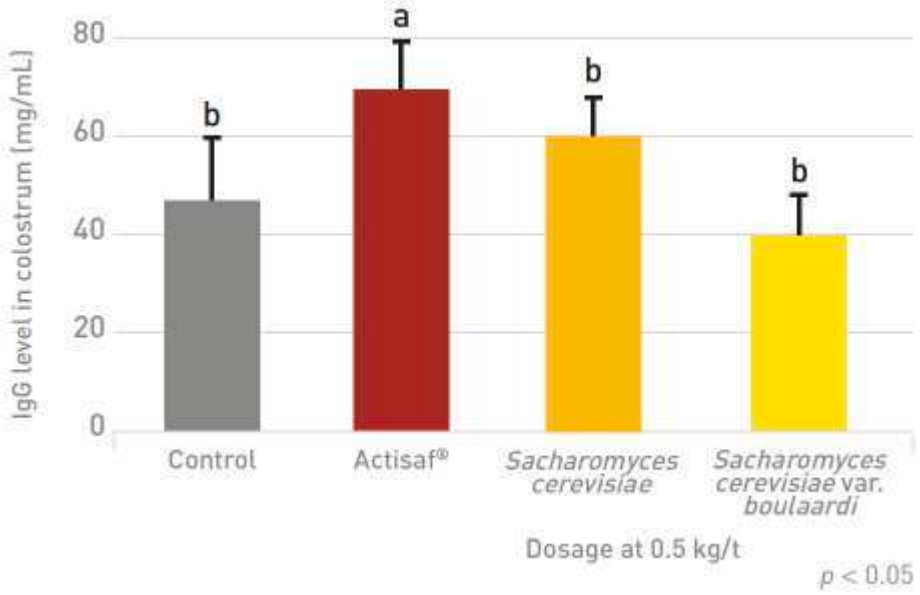


Increased IgG production and supply to pigs

Phileo by Lesaffre

Colostrum quality with Actisaf®

Supplementing sow diets with Actisaf® during late gestation and lactation increases IgG concentration in the colostrum



Zanello et al., 2013

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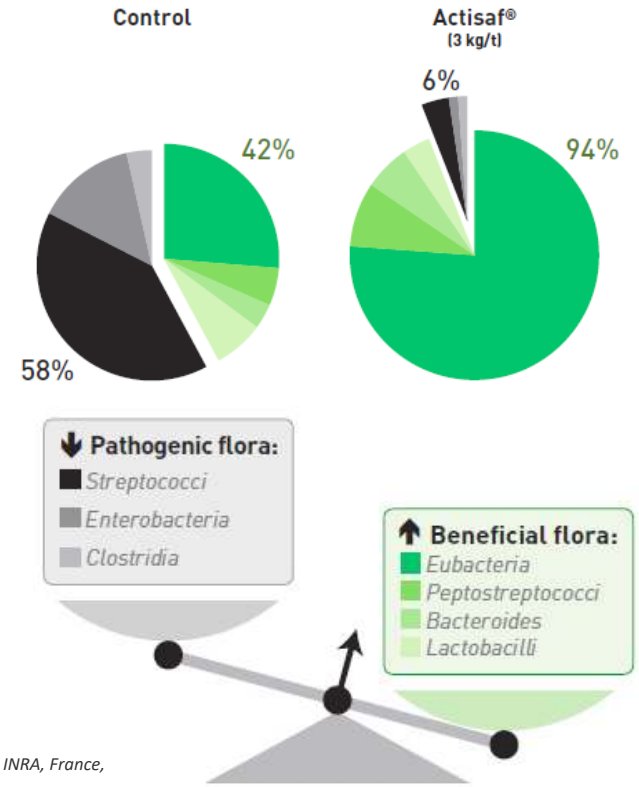
ActiSaf® HR+ fed to sows…

…affects nursing piglet microflora.

Effect of Actisaf® on suckling piglets microbiota when supplemented in the feed of sows during gestation and lactation



Just et al.,2002, INRA, France,

Actisaf® through the sow

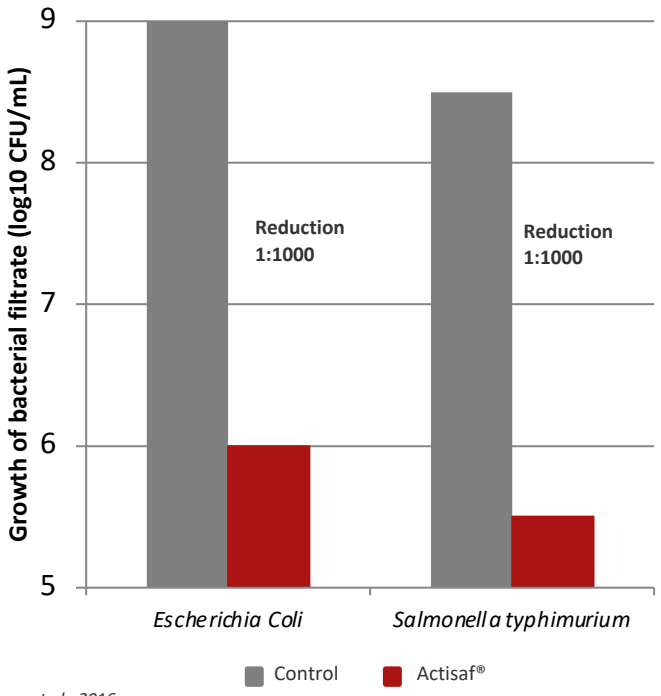
↑ Development of beneficial microflora

↓ Pressure from pathogens

Phileo by Lesaffre

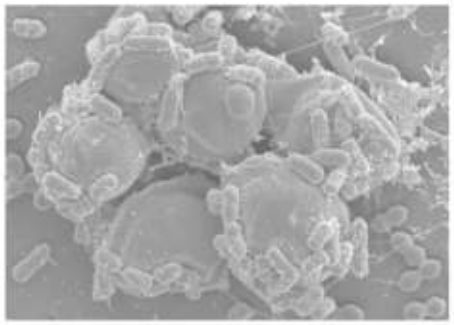
Reducing pathogen pressure

Effect of Actisaf® on the growth inhibition of various pathogens – *in vitro*



Donaldson et al., 2016

Binding of live yeast with *Salmonella enterica*



Posadas et al., 2017

- Gram positive pathogens bind to yeast cell wall.
- Eliminated from GI tract without binding to intestine.

Actisaf ® :

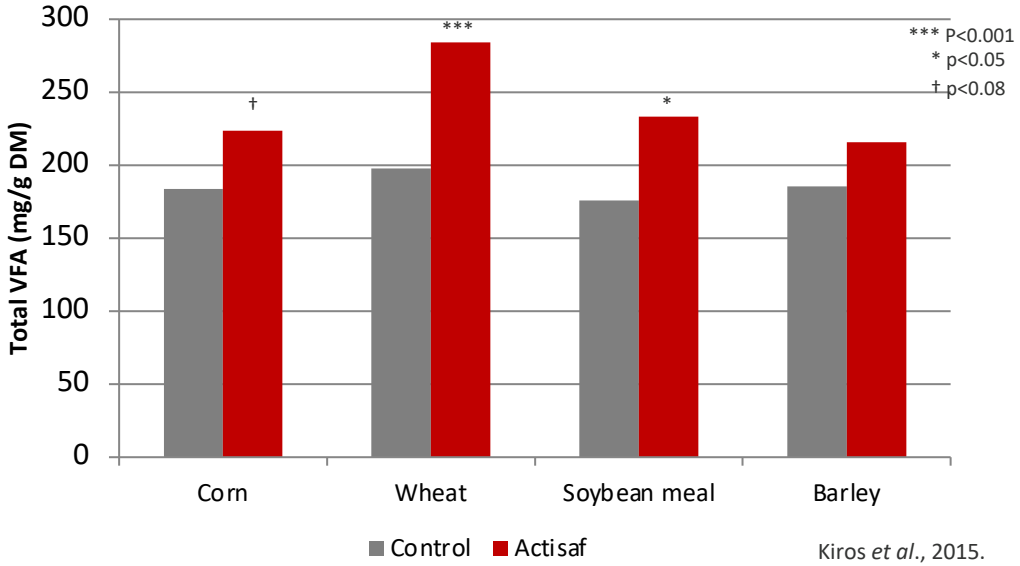
↑ Development of beneficial microflora

↓ Pressure from pathogens by binding

↗ Feed efficiency

↑ Energy from colonic fermentation

Effect of Actisaf® on the fermentation of different feed ingredients in distal gut



Kiros *et al.*, 2015.

> Actisaf® increases VFA production by 28%

Daily supplementation with Actisaf® may favour increased fermentative activity in the hindgut of the pig, increasing the energy value of feed ingredients.

Actisaf® in feed : ↗ efficacy of the diet

➔ ensure good performance of pigs

↑ Zootechnical performance in suckling piglets…

Study aim:

Benefits of Actisaf® in new born diarrhea and litter homogeneity at weaning

Methodology:

1300 sows ; Yorkshire x La

- **Control: no supplementation**
- **Actisaf ®(supplemented for 5 consecutive weeks):**
  - **2 kg/T in Pre-farrowing feed (distributed from 7d to 4 d after farrowing)**
  - **1 kg/T in lactation feed**
  - **Gilts + second parity : 20 g/sow/day individual top-feeding (7d before to 4d after farrowing)**

Measurements:

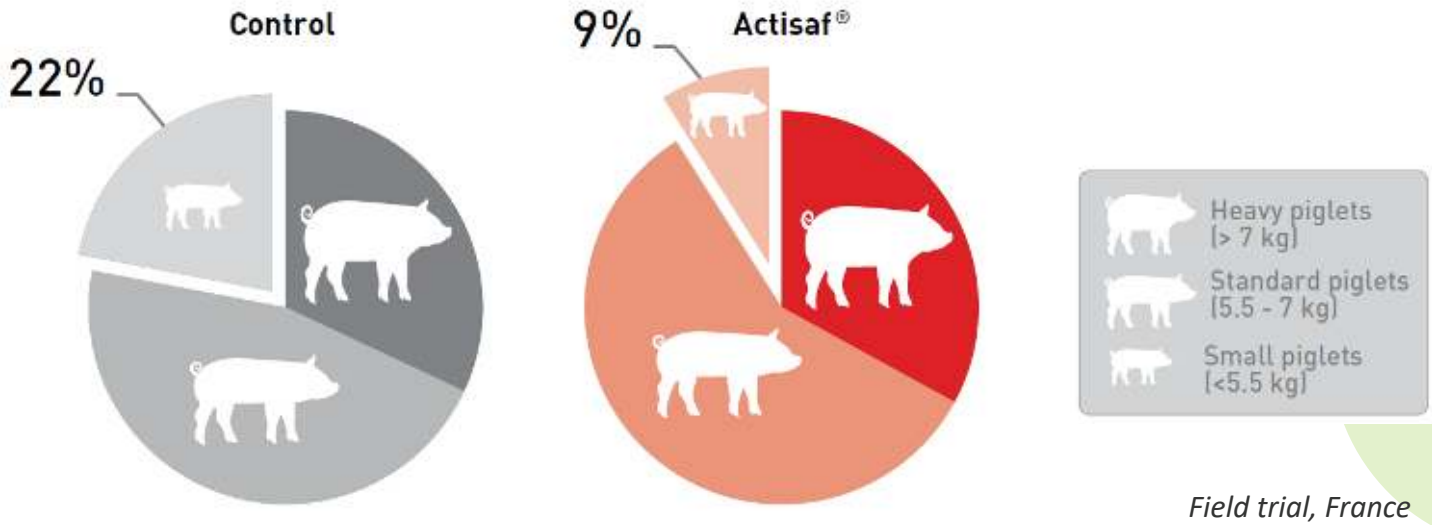
General health impairment, diarrhoea symptoms and litter homogeneity

Field trial, France

…..and help piglet management

↑ Litter weight
↑ Litter homogeneity
6:1 Return On Investment [a]

Effect of Actisaf® supplementation in the feed of sows on piglets weight distribution at weaning



Field trial, France

Better Litter homogeneity: -50 % of small piglets

→ Helps to improve batch management

Recent results from a commercial US research farm.

Phileo by Lesaffre

Effects of ActiSaf® HR+ in gestating and lactating sow diets on sow and piglet performance from breeding through 42 days after weaning.

Phileo by Lesaffre

Materials and Methods

- 190-211 sows/trt at farrowing; housed in stalls for duration of trial.
- 3 treatments
  - Control – No ActiSaf®
  - 1 gram/day Gestation & Lactation
  - 1 gram/day Gestation, then 3 gram/day Lactation
- Multiparous sows (~3.5 avg. parity)
- ActiSaf® HR+ blended into complete feed
- Sows and piglets were vaccinated according to current farm schedule.
- Subset of piglets were weaned and carry-over growth performance effects were measured.

Phileo by Lesaffre

Sow and litter data

- Sow BW at placement in the lactation barn
- Sow BW at weaning
- Feed intake during lactation
- Sow days in lactation
- wean to estrus
- Conception and farrowing rate
- Number of piglets born (alive and dead)
- Individual piglet birth weight (alive and dead)
- Pre-weaning mortality
- Individual piglet weaning weight
- Cross-fostering and Removals

Phileo by Lesaffre

Sow and Litter Results

Item	Control	ActiSaf® HR+ (1 g/hd/d)	ActiSaf® HR+ (3 g/hd/d)	P-value
Count	190	210	211	
Parity	3.5	3.6	3.6	
Sow lactation weight change[1], lb	-5.3	-12.2	-8.7	0.37
Lactation ADFI, lb	11.8	11.6	12.0	0.21
Lactation length, d	19.1	19.1	19.4	0.12
Wean to estrus interval, d	7.1	5.3	6.2	0.17
Birth wt., litter	38.6	39.1	39.5	0.40
Wean wt., litter	148.2	148.8	148.7	0.98
Total born, n	14.2^{b}	14.3^{b}	15.0^{a}	0.04
Born alive, n	12.6^{ab}	12.5^{b}	13.1^{a}	0.05
Stillborn, n	1.5	1.5	1.6	0.47
Mummies, n	0.11	0.11	0.10	0.90
Pigs/litter, n				
d 0[2]	12.3^{b}	12.5^{ab}	12.6^{a}	0.02
wean	11.1	11.3	11.2	0.61

^{ab}Within a row and main effect, means without a common superscript differ (P < 0.05).

[1]Weaning Sow BW minus Post farrow sow BW

[2]Litter size after equalization.

Phileo by Lesaffre

Litter Birth Number Results

Item	Control	ActiSaf® HR+ (1 g/hd/d)	ActiSaf® HR+ (3 g/hd/d)	P-value
Total born, n	14.2[b]	14.3[b]	15.0[a]	0.04
Born alive, n	12.6[ab]	12.5[b]	13.1[a]	0.05
Pigs/litter, n (after equalization)				
day 0	12.3[b]	12.5[ab]	12.6[a]	0.02
wean	11.1	11.3	11.2	0.61

Phileo by Lesaffre

Materials and Methods, Colostrum & Milk

A 2nd experiment was conducted to measure ActiSaf® effects on sow colostrum and milk immunoglobulins.

- last 60 d of gestation
  - 1 gram/day ActiSaf® HR+ was mixed into gestation feed, kept in separate bin and hand-fed 1x daily to treated gestating sows.
  - Control sows were fed 1x daily via feed-line drop-box.
  - Sows were given lactation feed top-dressed (1 lb/d) with ActiSaf® HR+ premix at 3 doses.
    - 0, 2, or 5 grams/head/day.
    - Sows for 2 or 5 gram were divided equally from sows fed ActiSaf® HR+ in gestation. Control lactation sows were from Control gestating sows.
  - Sow colostrum samples were collected within 24 hr after farrowing.
  - Sow milk samples were collected on d 18 after farrowing.

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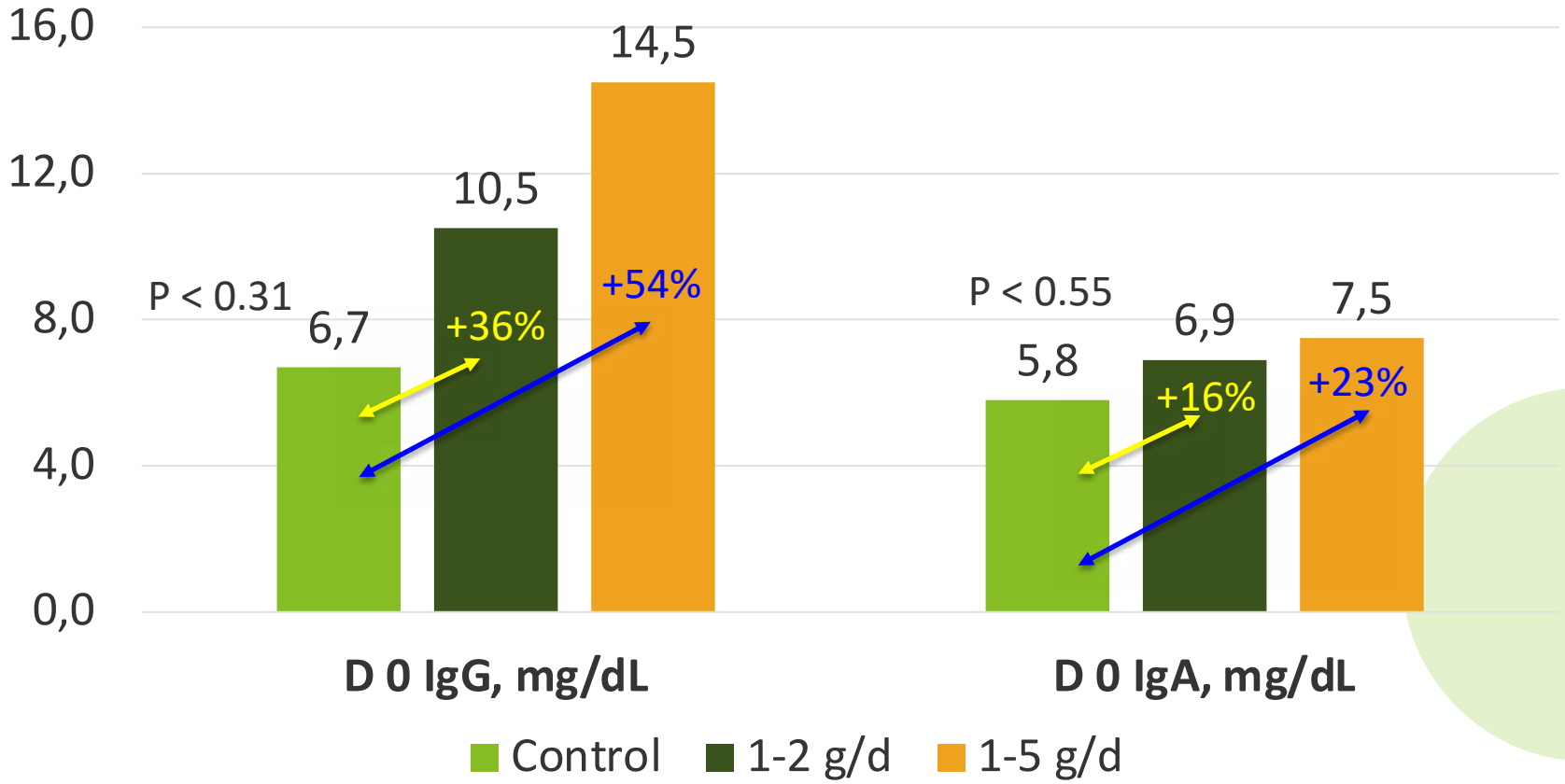
Sow Colostrum Immunoglobulins



Numerically consistent with earlier European data.
Limited replication with 15, 13, 14 sows/trt, respectively.
No numerical differences observed with d 18 milk results.

Phileo by Lesaffre

Conclusions

ActiSaf® can help improve microbiota activity and increased number of pigs born/sow.

Litter size can be increased with ActiSaf® use. This is consistent with reported customer experiences.

Immunoglobulin concentrations were numerically improved with ActiSaf® use.

Phileo by Lesaffre

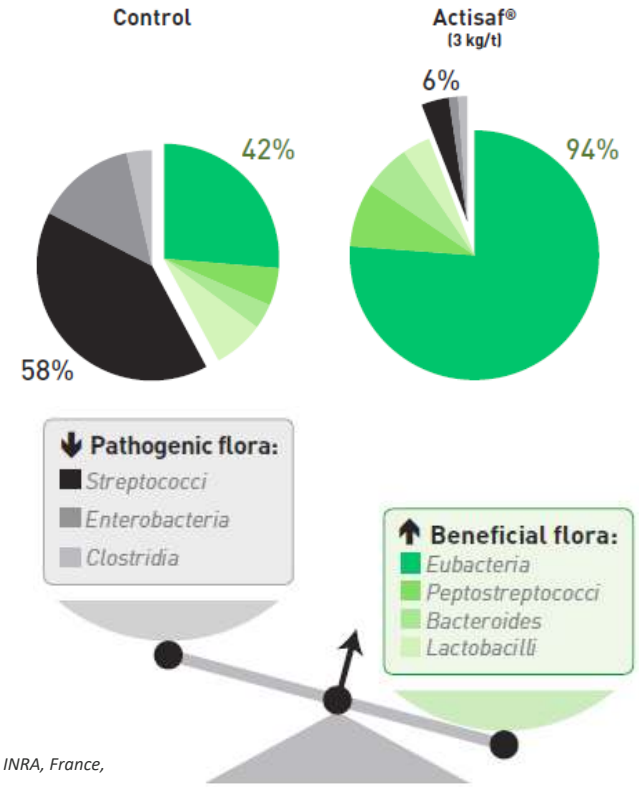
Carryover Effects of feeding sows ActiSaf® HR+ on piglet performance after weaning.

Phileo by Lesaffre

ActiSaf® HR+ fed to sows…

…affects nursing piglet microflora.

Effect of Actisaf® on suckling piglets microbiota when supplemented in the feed of sows during gestation and lactation



Just et al.,2002, INRA, France,

Actisaf® through the sow

↑ Development of beneficial microflora

↓ Pressure from pathogens

Phileo by Lesaffre

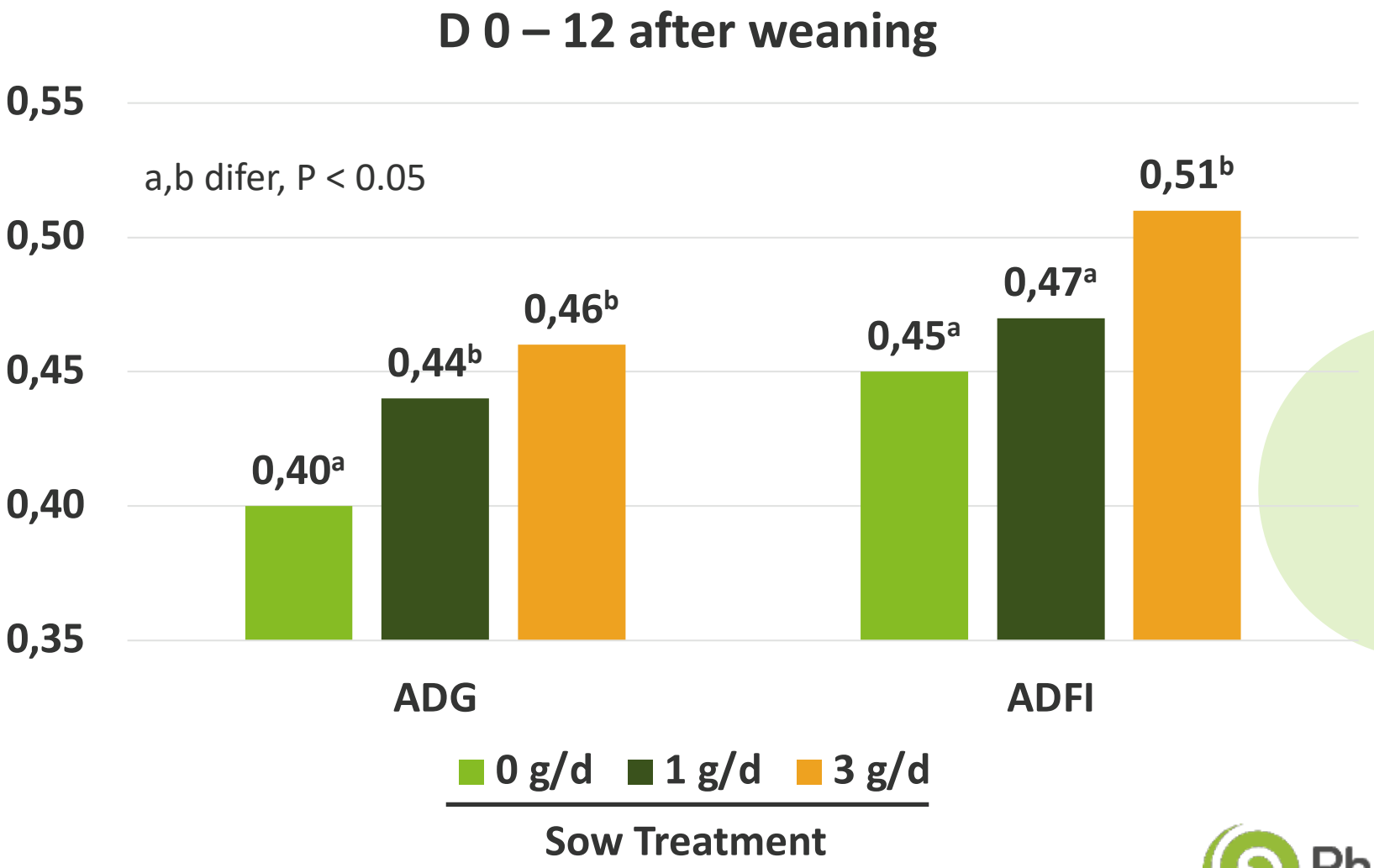
Carryover Effects on Weaned Pigs

Objective: Measure performance effects on pigs weaned from sows fed ActiSaf® HR+ in a 42 day nursery growth assay.

- Materials and Methods:
- 6 treatments (3x2 design)
  - 21 pigs/pen; 10 replicate pens/trt.
- 3 Sow Lactation Treatments
  - 0, 1, 3 g/hd/d
- 2 Weaned Pig Treatment (ActiSaf® or No Actisaf® in nursery feed).
  - Fed at 2 lbs/ton for d 0 to 10 (Phase 1), then 1 lb/ton through d 42.
- Diets were medicated with CTC and/or Denagard.
- At about d 25 after weaning, pigs sero-converting to PRRS, experienced hemolytic ecoli, rotavirus, flu and PCV 2&3.
- No interactions or weaned pig main effects were observed. Only sow main effects are reported.

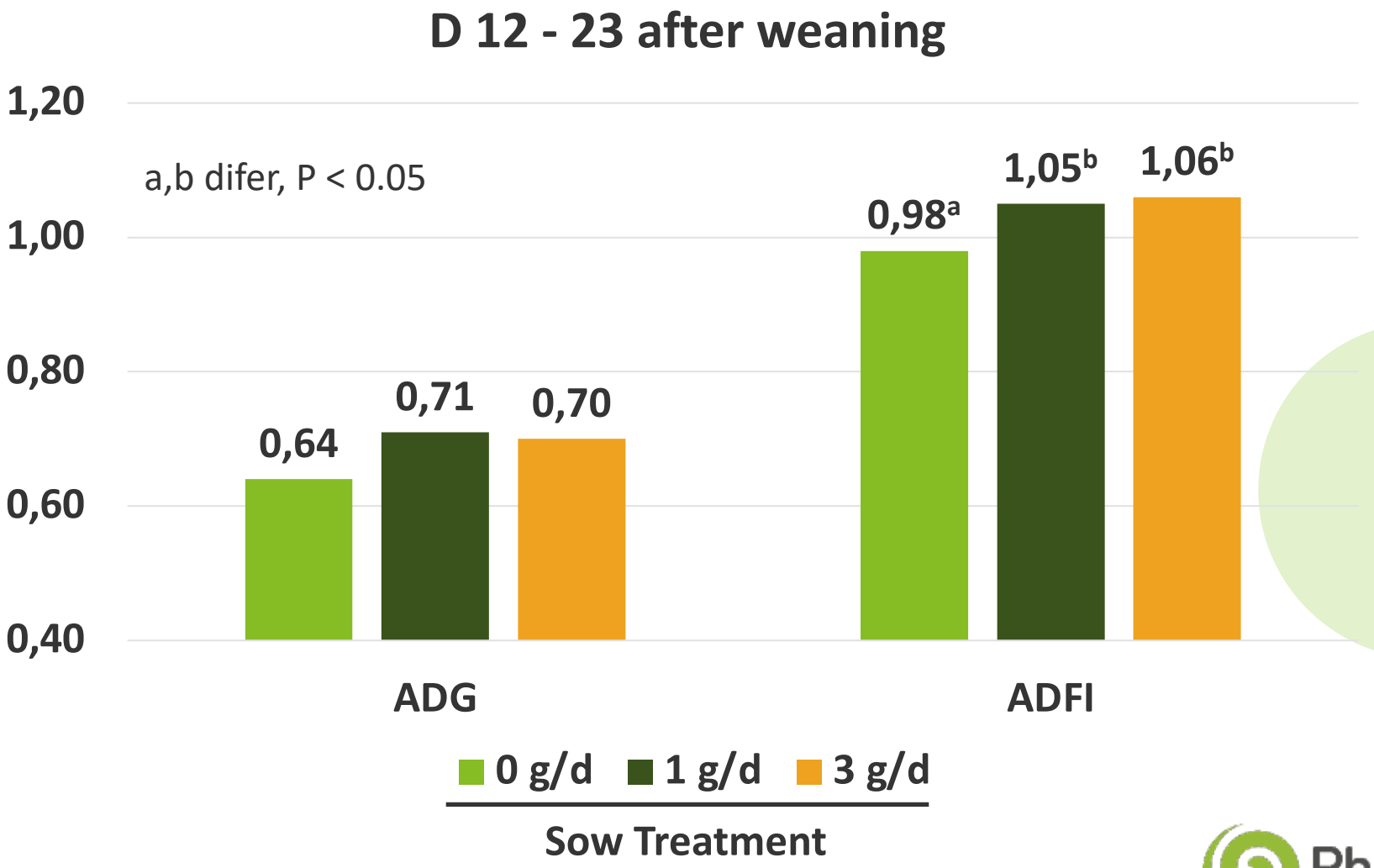
Phileo by Lesaffre

Phase 1 Growth Performance



Phileo by Lesaffre

Phase 2 Growth Performance



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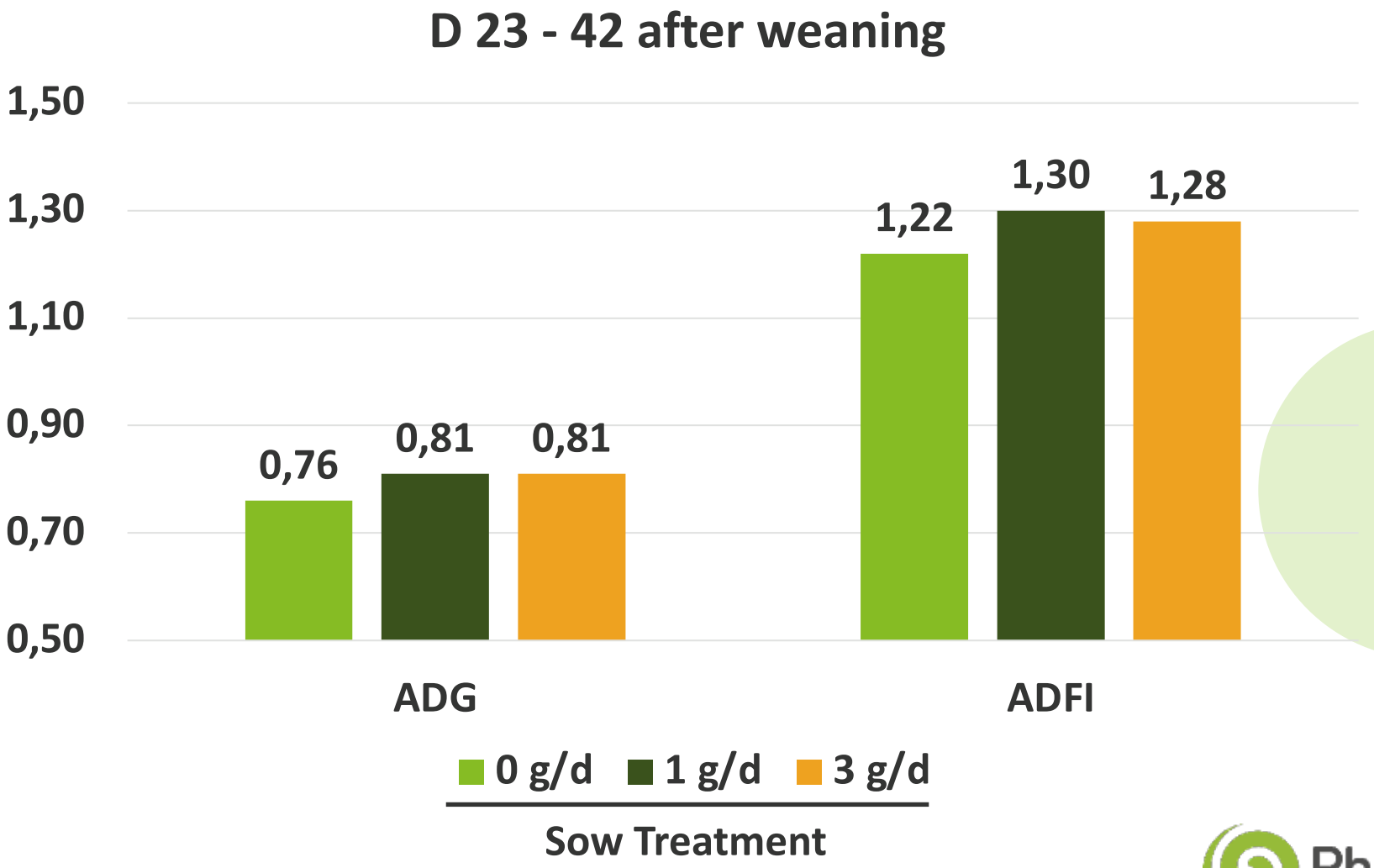
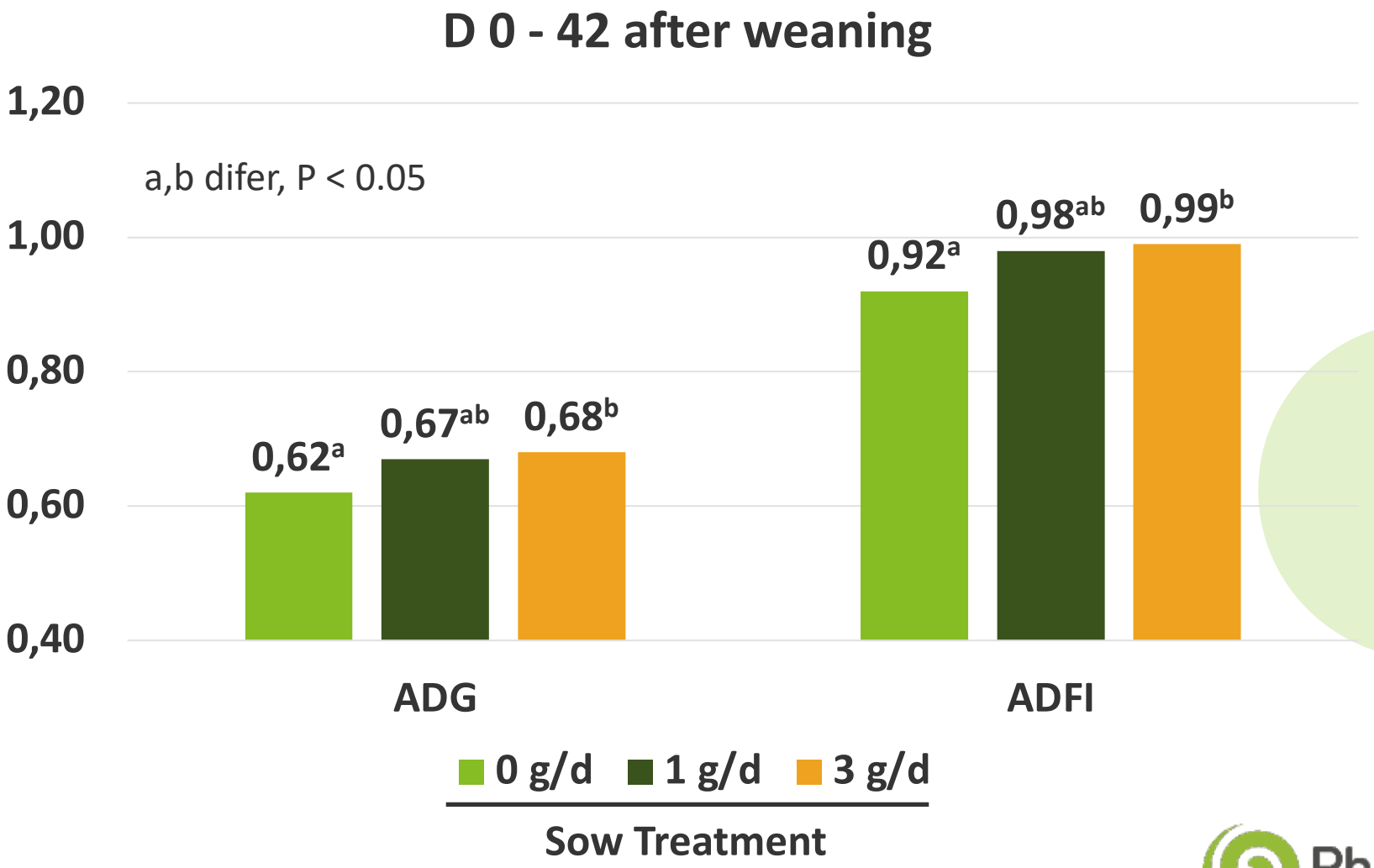
Phase 3 Growth Performance



Phileo by Lesaffre

Overall Growth Performance



Phileo by Lesaffre

Overall Results

	Probability, P (<)	Sow Effect		
D 0 to 42	Sow	0	1 g/d	3 g/d
$/lb gain	0.06	0.256	0.246	0.244
Removals, #	0.50	0.80	0.70	1.05
Mortality, #	0.08	0.80	0.55	0.30
Full Value, %	0.92	84.5	83.6	84.8
*Estimates in the same row with different letters are significantly different.				

Phileo by Lesaffre

Carryover Bodyweight Effects

	Sow Treatment Carryover Effect			P (<)
	0	1 g/d	3 g/d	Sow
Initial BW, lbs	12.2^{B}	12.5^{A}	12.0^{C}	<0.001
D 12 BW, lbs	16.9^{C}	17.9^{A}	17.4^{B}	<0.001
D 23 BW, lbs	24.1^{B}	25.7^{A}	25.2^{A}	0.001
D 42 BW, lbs	39.7^{B}	42.4^{A}	41.6^{AB}	0.009
D 0-42 Gain, lbs	27.5	29.9 (+2.4)	29.6 (+2.1)	--
D 42-178 Gain, lbs	262.7^{A}	268.7^{B} (+6.0)	263.2^{A} (+1.0)	0.040
D 0-178 Gain, lbs	291.2^{A}	299.1^{B} (+7.9)	293.9^{A} (+2.7)	0.031

Phileo by Lesaffre

Summary

- Sows fed ActiSaf® HR+ provided a carry-over effect on ADFI and ADG for Phases 1, 2, 3, and overall.
  - Pigs from sows fed ActiSaf® HR+ had improved growth performance.
    - Weight gain advantage continued through at least day 42 after weaning.
  - Pigs from sows fed ActiSaf® HR+ also had lowest cost/lb gain
    - **Savings of ~$0.35/pig.**
  - Microbiota effect from Gestation and Lactation?
    - Would be consistent with previous results.
- Mortality trended lower in pigs from sows fed ActiSaf® HR+.

Phileo by Lesaffre

ActiSaf Sc 47 HR+
NEW GENERATION

Multiple benefits demonstrated by feeding ActiSaf live yeast probiotic include:

- Improved viability in all feed types.
- Binds gastrointestinal pathogens.
- Promotes beneficial changes in sow and offspring microbiota.
- Improved immune activity.
- Improved sow and litter productivity.
- Improved piglet lifetime growth performance and production costs.

Phileo by Lesaffre

phileo-lesaffre.com

RAISING LIFE

Phileo by Lesaffre

Premium Yeast Products from the World's Largest Primary Fermenter