October 2025

“The role of postbiotics in modern swine production”

Dr Charlie Cador

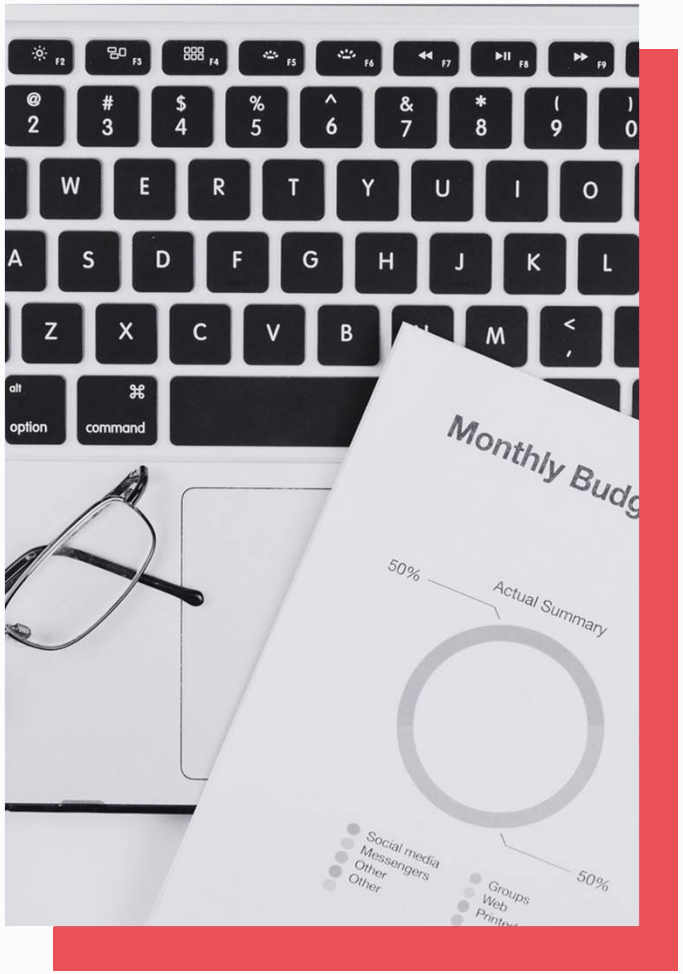
Summary

01 Context

02 Postbiotic

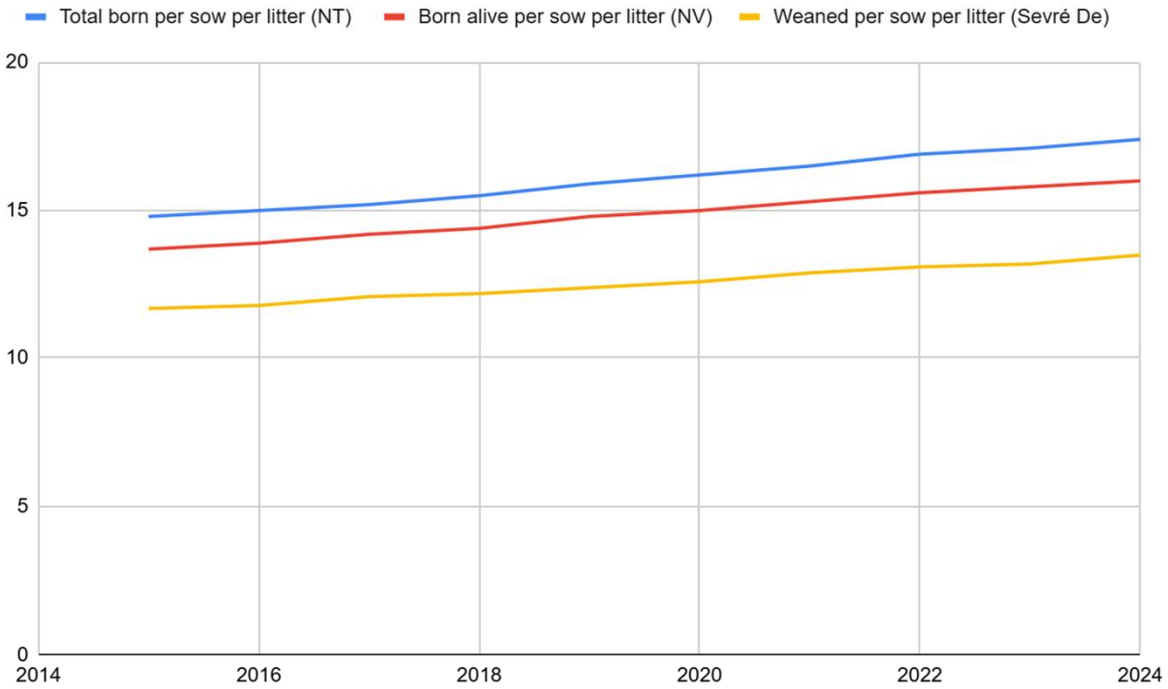
1. Selection by *In vitro* approach
2. Confirmation by *In vivo* approach

03 Conclusion



Context

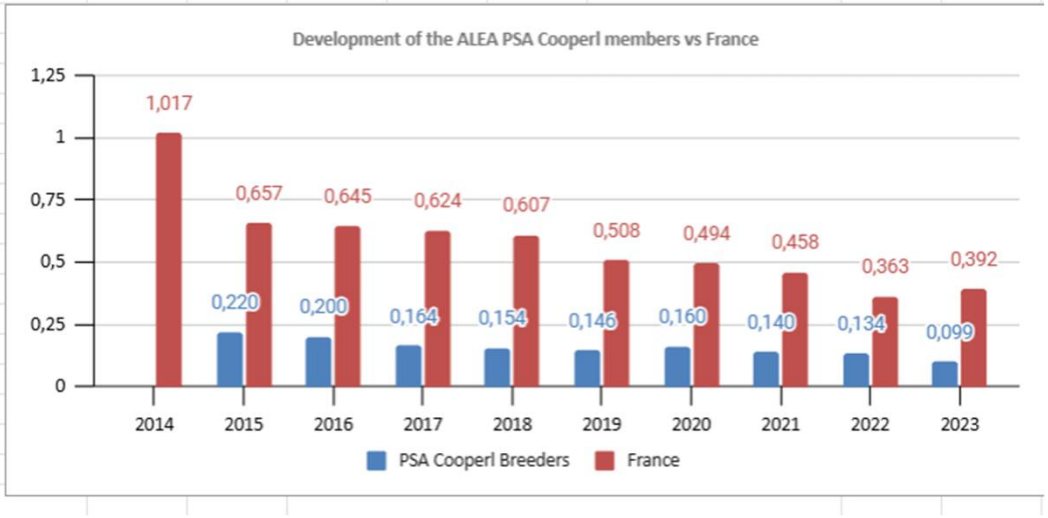
Nucleus Prolificacy trends 2015–2024 (source: GTTT Cooperl)



Context

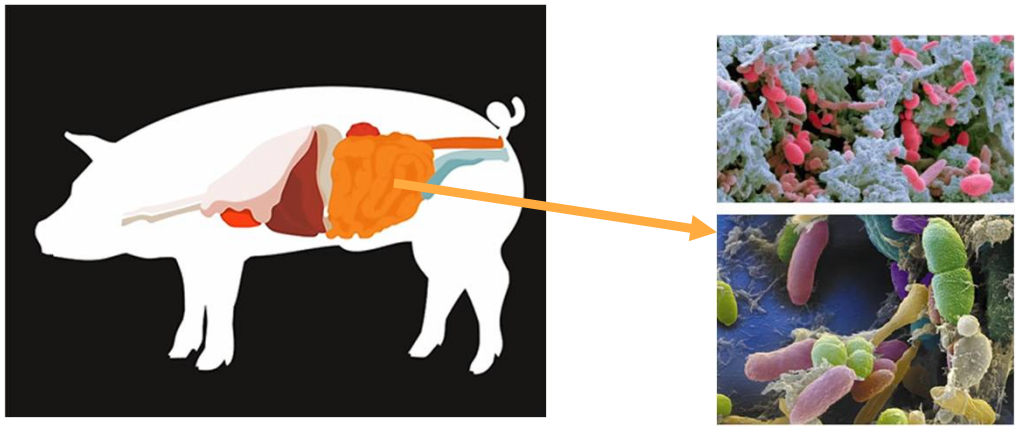
Development of the ALEA PSA Cooperl members vs France

	PSA Cooperl Breeder	France
2014		1,017
2015	0,220	0,657
2016	0,200	0,645
2017	0,164	0,624
2018	0,154	0,607
2019	0,146	0,508
2020	0,160	0,494
2021	0,140	0,458
2022	0,134	0,363
2023	0,099	0,392



Sources : Anses national Report, Cooperl

Microbiota: definitions and roles



→ Improves digestion, absorption and metabolism of nutrients
→ Holds a key role in immunity
→ Intervenes throughout the growth process

An important player in farm animal health and performance

Sows microbiota

Health

Genomes extracted from intestinal microbiota significantly different between farms with healthy and unhealthy animals

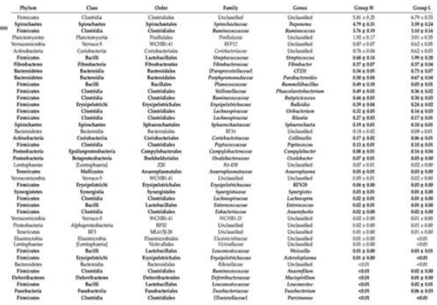
Andreia Arruda *et al*., 2019, Nasal and gut microbiota for sows of different health status within six commercial swine farms from one swine production system

Performance

Proven link between microbiota and sow productivity

Haruka Uryu *et al*., 2020, Comparison of Poductivity and Fecal Microbiotas of Sows in Commercial Farms, Microorganisms 8(10)

Parameters of Reproductive Performance	Group H ($n = 9$)	Group L ($n = 9$)	Welch's t-Test p Values
Number of piglets weaned/sow/year	**27.69 ± 0.33**	**19.33 ± 0.62**	**5.3×10^{-8}**
Farrowing rate	**0.89 ± 0.01**	**0.80 ± 0.02**	**2.7×10^{-3}**
Farrowing/sow/year	**2.41 ± 0.02**	**2.21 ± 0.02**	**4.3×10^{-6}**
Number of piglets born/litter	**14.68 ± 0.43**	**11.48 ± 0.30**	**2.4×10^{-5}**
Number of piglets born alive/litter	**13.27 ± 0.33**	**10.24 ± 0.32**	**6.9×10^{-6}**
Number of stillbirths/litters	1.42 ± 0.14	1.23 ± 0.17	0.42
Pre-weaning mortality	0.13 ± 0.02	0.15 ± 0.02	0.53

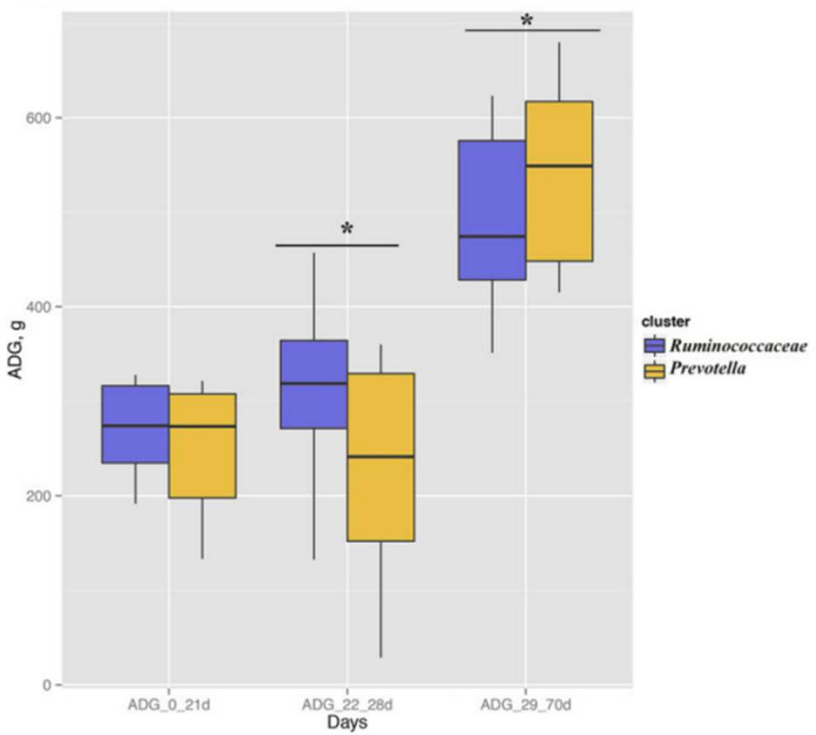


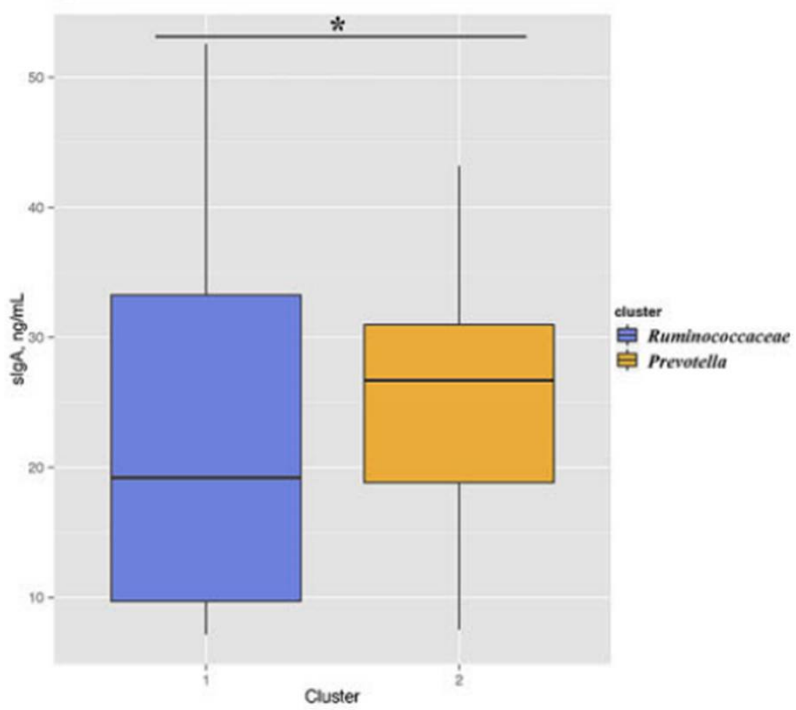
Relative abundances of 43 bacterial genera that significantly differed between high-and low-reproductive performance groups.

Farrowing rate: Farrowing of inseminated sows. Parameters with significant differences between groups H and L are shown in bold ($p < 0.05$). Mean ± SE is shown.

Parameters of reproductive performance in high-and low-reproductive performance groups.

Piglets microbiota



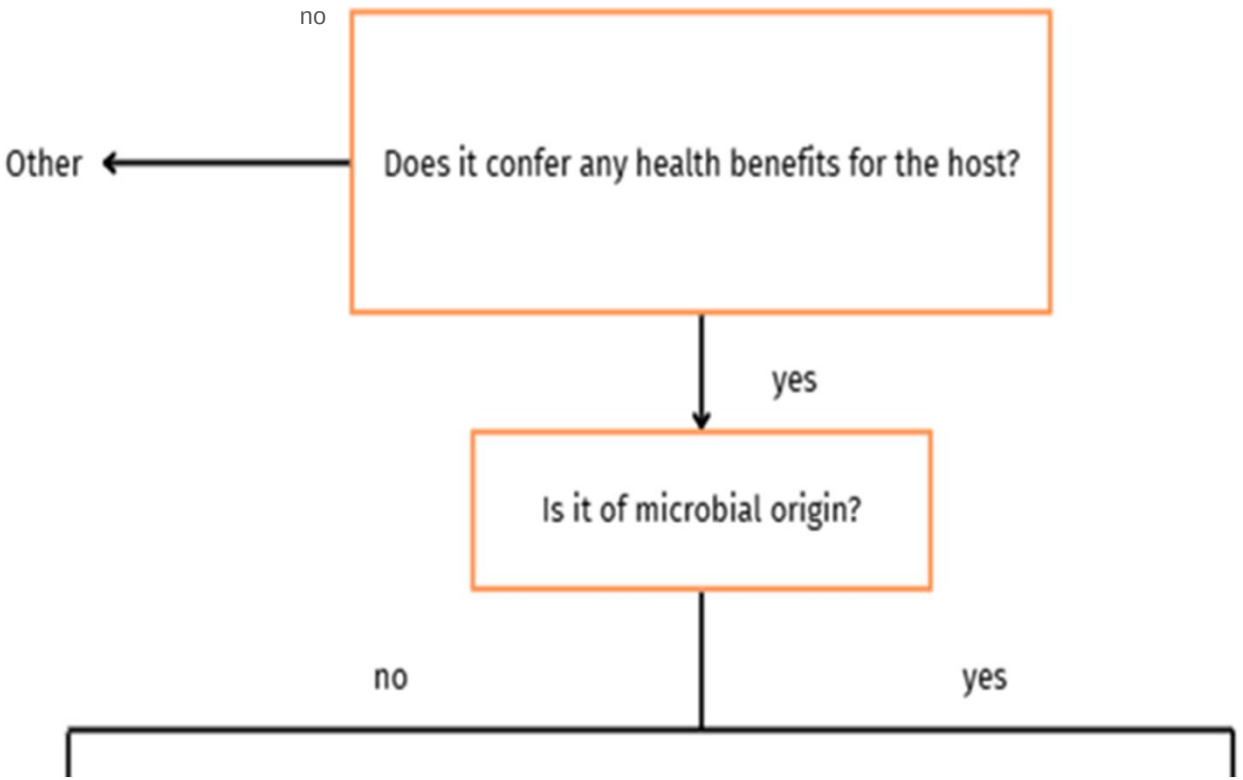


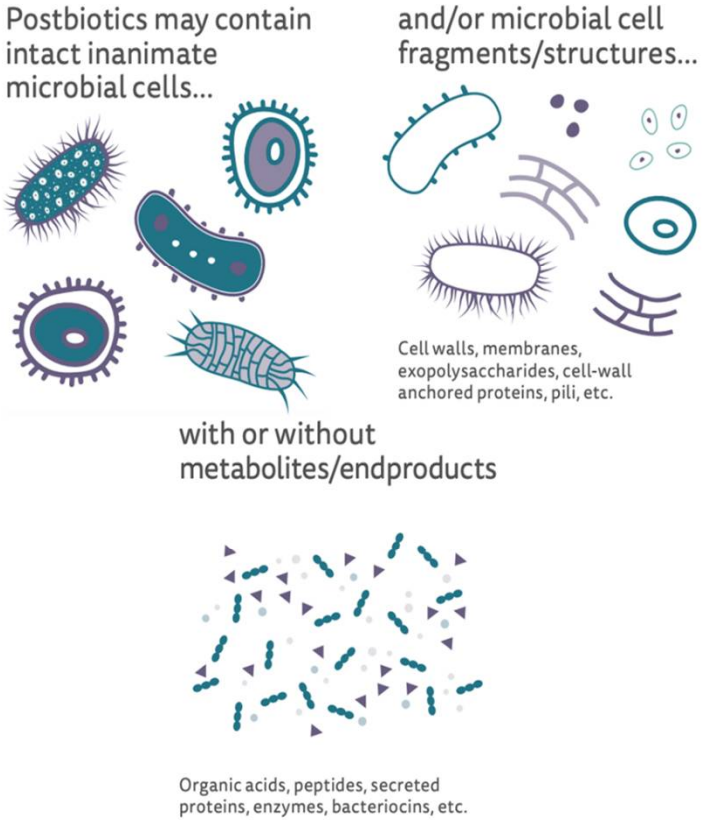
Weight gain and secretory IgA concentration as a function of microbiota composition

Source : Mach *et al.*, 2015

"How can the use of postbiotics support strong animal performances in modern swine production?"

Pre, Pro et Postbiotic : definitions





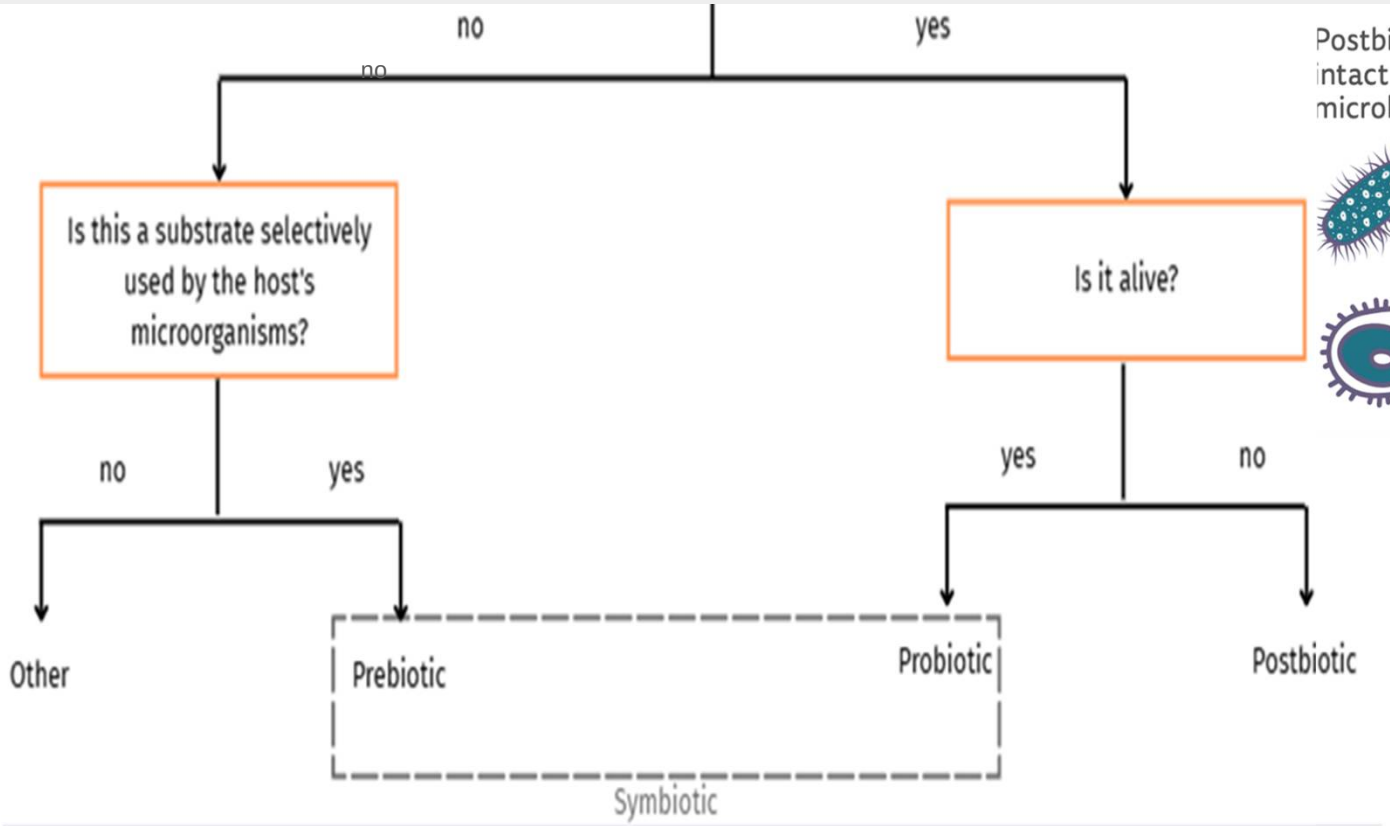
Source : ISAPP

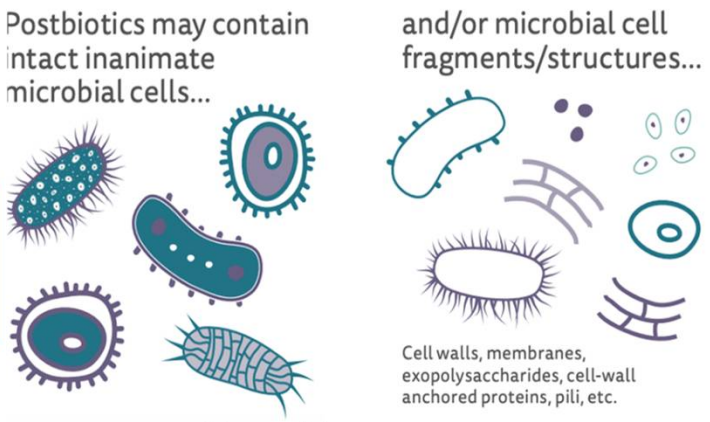
Slide 9

2 change "et" to "and"
Myrene Aguirre, 09/06/2025

1 bigger font on the boxed phrases
Myrene Aguirre, 09/06/2025

Pre, Pro et Postbiotic : definitions





Source : ISAPP

Slide 10

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Myrene Aguirre, 09/06/2025

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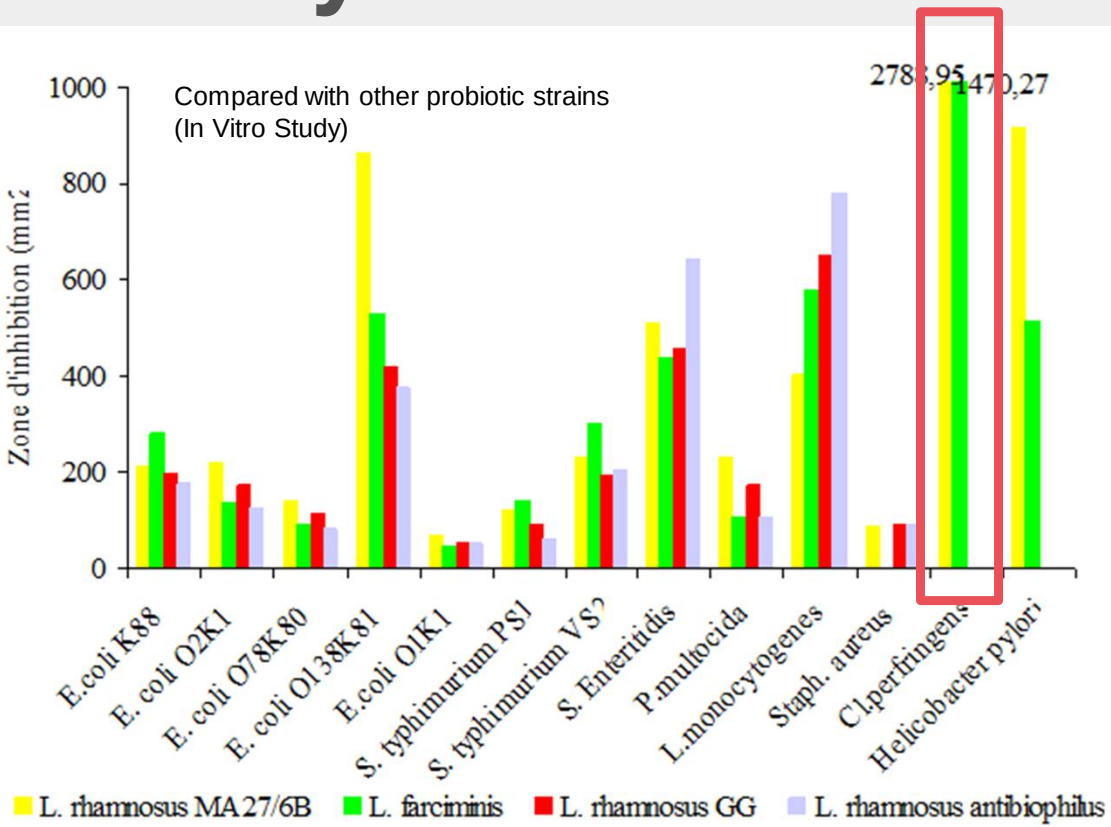
Selection by *In vitro* approach

Postbiotic: why those bacteria?

Bernardeau *et al*., 2009



Postbiotic: mechanisms of action

Barrier effet

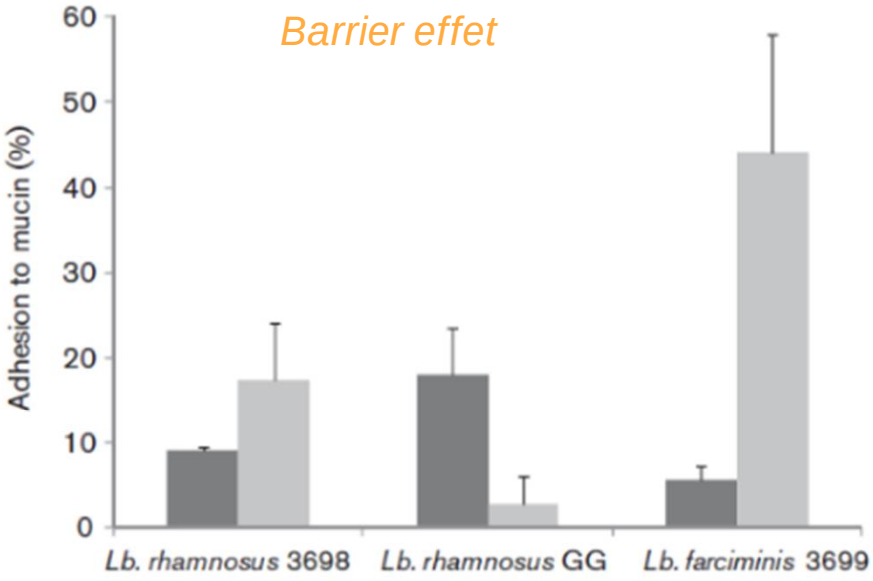


Fig. 5. Adhesion of viable (dark-grey bars) and heat-killed (120 °C, 15 min) forms (light-grey bars) of three probiotic *Lactobacillus* strains to a mucin layer ($n=3$) determined by qPCR.

Co - Aggregation effect

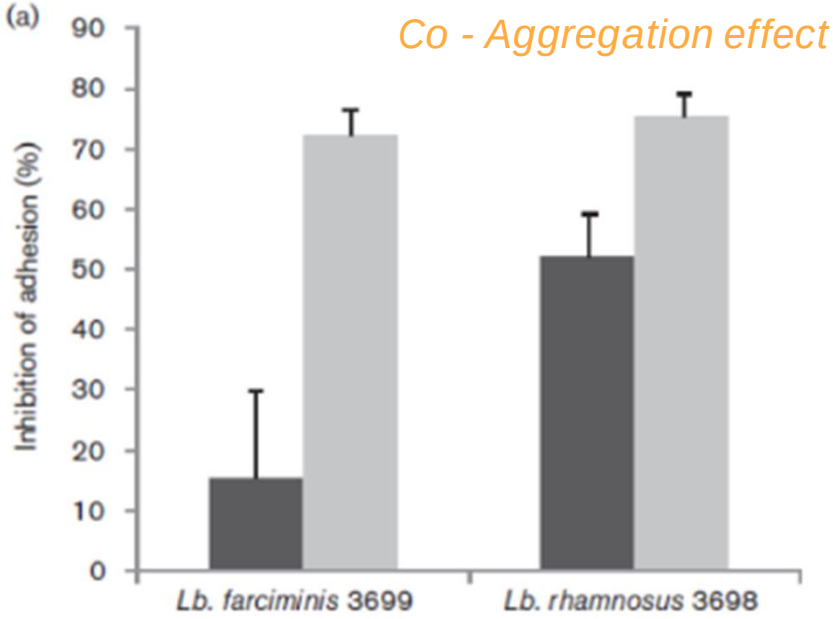


Fig. 7. Evaluation of the prevention of attachment of *C. jejuni* CIP 70.2^T to a mucin layer by viable (dark-grey bars) and heat-killed forms (light-grey bars) of *Lb. farciminis* 3699 and *Lb. rhamnosus* 3698 ($n=3$).

Tareb *et al.*, 2013

Postbiotic: mechanisms of action

Co - aggregation effect on Campylobacter jejuni

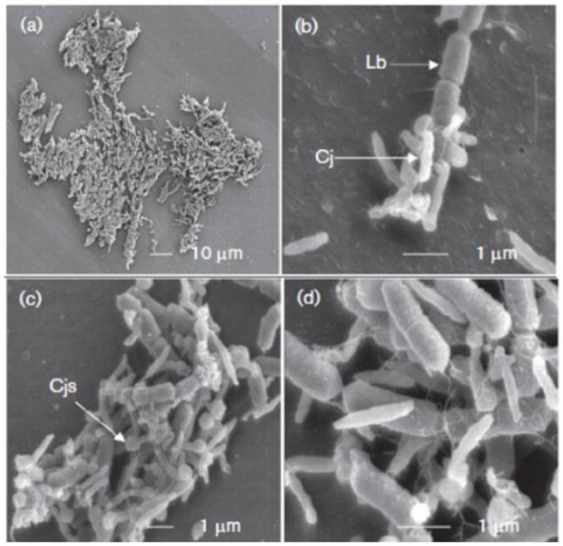
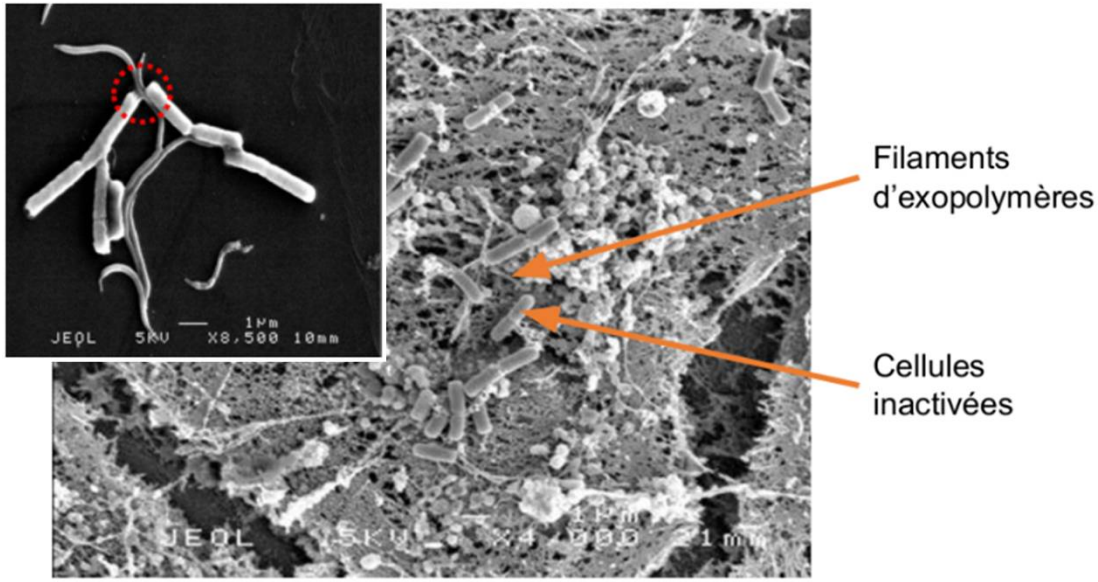


Fig. 2. Scanning electron microscopic observation of *Lb. rhamnosus* CNCM-I-3698 (Lb) coaggregating with *Campylobacter jejuni* CIP 70.2^T (Cj) and forming cell clusters (a, b), with synthesis of exopolymeric filaments (c, d). Cjs, stress form of *C. jejuni* CIP 70.2^T (coccoid).

Co - aggregation effect on Brachyspira

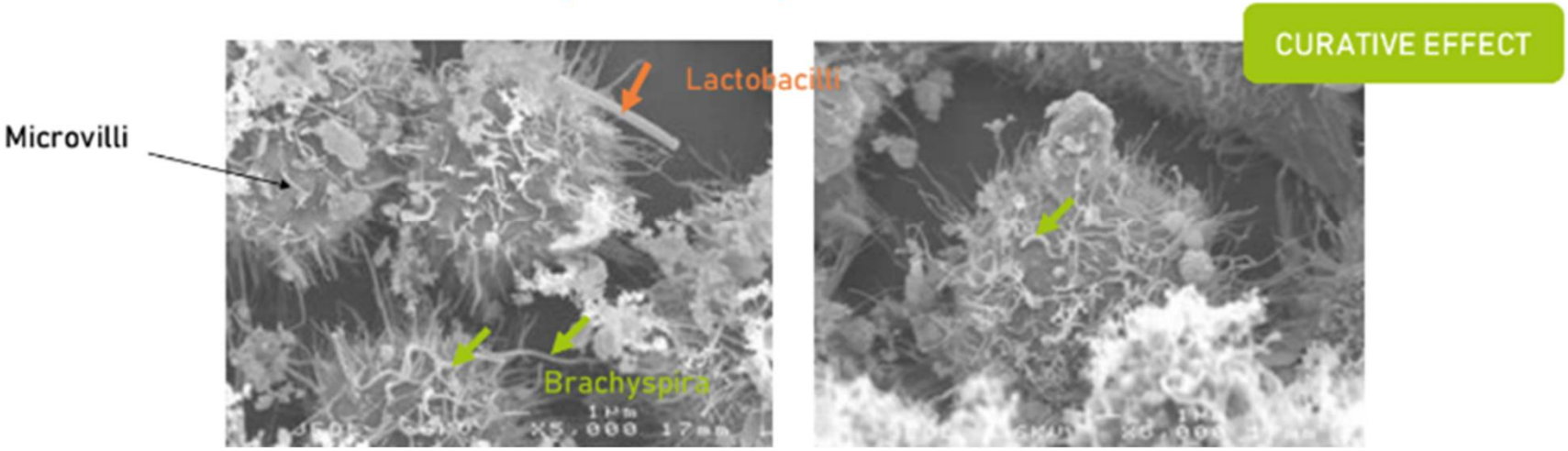
Bernardeau *et al*., 2009



Postbiotic: mechanisms of action

Bernardeau *et al.*, 2009

Inhibition of Brachyspira adhesion to the intestinal mucosa - in vitro
Example with B.pilosicoli 51139



The close contact of inactivated lactobacilli cells with Brachyspira prior to adhesion to the intestinal mucosa (INT 407) limits and prevents the adhesion of Brachyspira cells.

Postbiotic: mechanisms of action

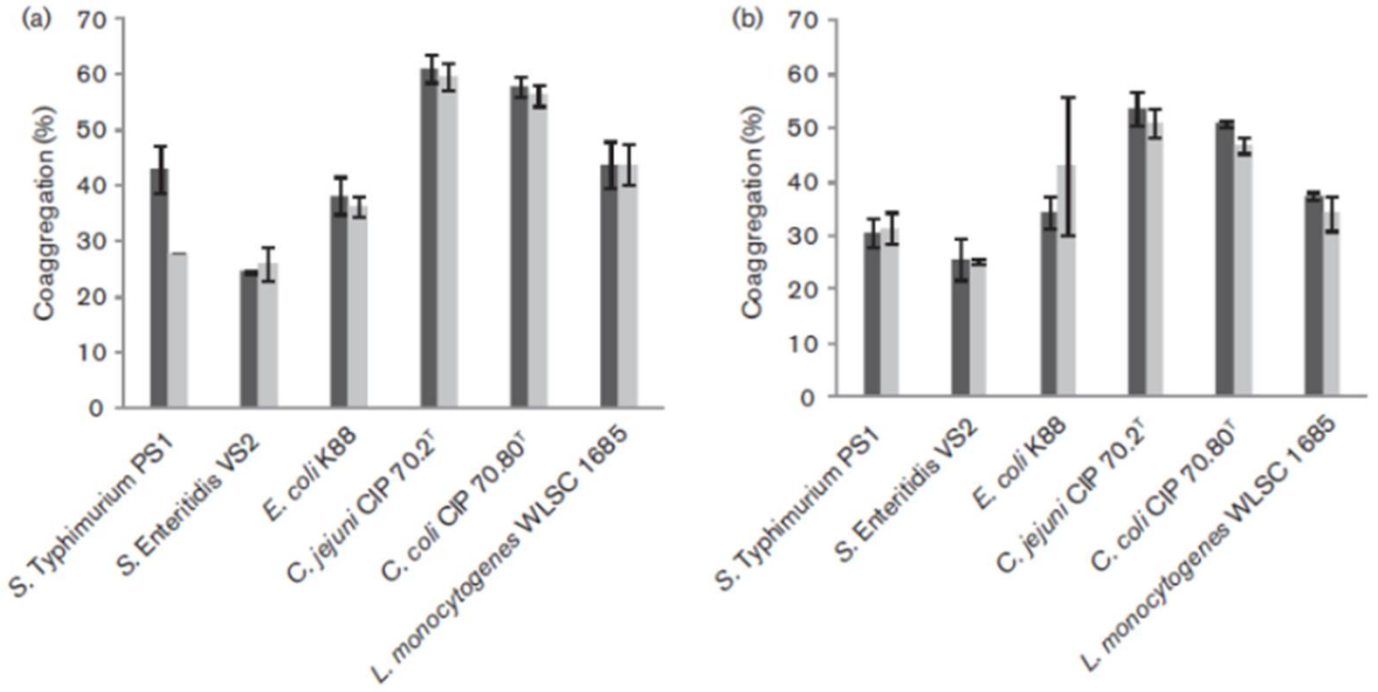


Fig. 1. Coaggregation abilities of viable forms (dark-grey bars) and heat-killed (120 °C, 15 min) forms (light-grey bars) of (a) *Lb. rhamnosus* CNCM-I-3698 and (b) *Lb. farciminis* CNCM-I-3699 after 24 h contact with different pathogenic isolates.

Tareb *et al*., 2013

Postbiotic: composition

Inactivated bacterias

Lactobacillus rhamnosus CNCM-I-3698

Lactobacillus farciminis CNCM-I-3699

Culture medium and metabolites from lactic fermentation

- Metabolites with **antimicrobial** activity (lactic acid, H202, bacteriocins, bacterial bodies)
- Metabolites of **nutritional** interest (enzymes, amino acids, vitamins, etc.)
- **Immunostimulant** properties (polysaccharides)

Comparison by *In Vivo* approach

Step 1: Results on weanlings and fattening pigs

Slide 19

3 change "weanings" to "weanlings"

Myrene Aguirre, 09/06/2025

1 Trials Results - Better ADG and mortality decrease

Farm with cases of porcine proliferative enteritis (PPE)

- *France, 2003*
- POSTBIOTIC at 2kg /T during post-weaning and fattening
- 2 CONTROL batches and 2 POSTBIOTIC Powder batches
- Follow up of animals from Post-weaning to slaughterhouse

	CONTROL	POSTBIOTIC
Piglets Number	1212	1025
ADG (g / d)	432	**460** +6.53%
Mortality (%)	0.99	**0.83** -15.99%

Post-weaning results

	CONTROL Batch 1	CONTROL Batch 2	POSTBIOTIC Batch 1	POSTBIOTIC Batch 2	CONTROL Average	POSTBIOTIC Average
Entry weight (kg)	29.5	30.0	31.9	30.0	29.8	30.95 +1Kg
ADG 0-21 (g / day)	764	645	863	755	704	**809** +2.2%
FCR 0-21	2.07	2.17	1.90	2.14	2.12	**2.02** -0.10
Mortality rate (%)	0.50	2.36	0.80	1.01	1.43	0.91 -0.52%
Rate of digestive losses(%)	0.50	2.36	0.32	0.84	1.43	**0.58** -0.85%

Fattening results

Slide 20

5 replace the brand, "Farmaflore," with the active ingredient of the product.

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2 Trials Results - Better ADG and mortality decrease

	ANTIBIOTIC	POSTBIOTIC
Weight (kg)		
Post-weaning Entry	8.57	8.54
End of Post-weaning	22.52	22.57
End of Pre-Fattening	41.58	42.37
Weight gain	33.01	**33.83** +820g
Mortality (%)	4	**2** -50%

EXPORBA research station - Spain, 2015

2

Trials Results - ROI

	ANTIBIOTIC	POSTBIOTIC
Quantity of post - weaning feed consumed per piglet (kg)	17.86	18.23
Quantity of pre-fattening feed consumed per pig (kg)	34.12	34.25
Cost of supplements per piglet (€)	0.214	0.186
Cost of supplements per pre-fattening pig (€)	0.409	0.135
Total cost (€)	0.623	0.321

-0.30€

Economic results

Economic gain on the supplementation cost	0.302 € / pig
Gain in kilos of live weight (0.82 kg / pig x €1)	0.82 € / pig
Gain on mortality reduction (46.5kg / 80 pigs) x €1	0.58 € / pig
Total gain / treated pig with POSTBIOTIC	**1.702 € / pig**
For an average farm of 200 sows	**9 200 € / year**

EXPORBA research station - Spain, 2015

Step 2: Results on piglets

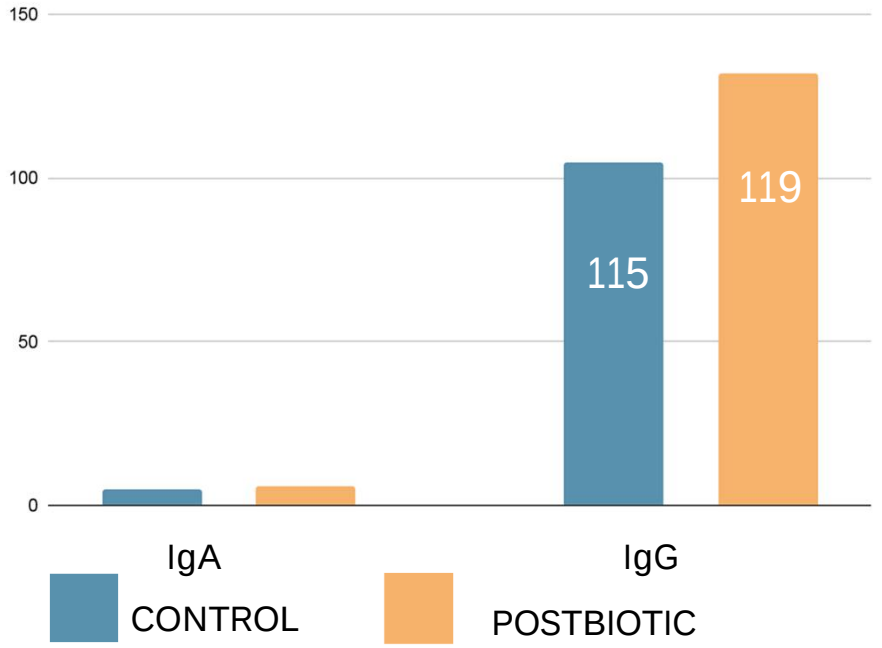
1 Trials results - Better colostrum quality

Presentation of the trial:

- China, 2020
- 30 sows of parity 3 to 7: 15 control sows and 15 tes
- Essential oils in the basic diet
- Piglets adopted within the first 3 days

in the same group - no adoption between the test groups

Concentration of immunoglobulins in colostrum



2 Trials results - Better colostrum quality and decrease of farrowing time

Presentation of the trial:

- France, 2024
- POSTBIOTIC at 3kg / T throughout the gestation
- 3CONTROL batches and 3 POSTBIOTICS Powder batches

Problems with neonatal diarrhoea

Both farms have a problem with neonatal diarrhoea, which causes stress for farm staff, losses and reduced animal growth.
Antibiotics are not used systematically, but are applied to litters as soon as clinical signs appear.

Slide 25

7 replace the brand, "Farmaflore," with the active ingredient of the product.
Myrene Aguirre, 09/06/2025

6 change "liters" to "litters"
Myrene Aguirre, 09/06/2025

2 Trials results - Better colostrum quality and decrease of farrowing time

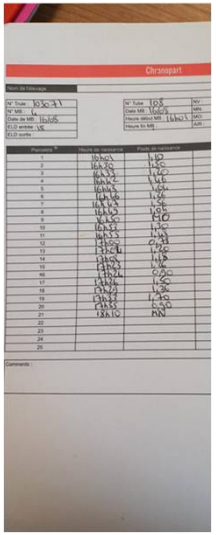
Data, measurements and samples taken

In both breedings

Around farrowing:

- farrowing follow-up (duration, BA, SB, Mu, etc.)
- colostrum sampling
- individual weighing of piglets at birth
- individual weighing at 24 hours of age

Recording of diarrhoea and frequency of treatment.



2 Trials results - Better colostrum quality and decrease of farrowing time

	Control	Postbiotics
Colostrum (BRIX)	**27.46**	**28.29**
Born Alive	15,99	15.81
Stillborn	1.03	0.83
ADG 24h (per litter)	**0.082**	**0.129**
Farrowing time (minutes)	**218**	**190**

Brix %	ELISA IgG (0 to 3h, mg / ml) (average ± SEM)	IgG estimation categories
<20	145 ± 1.8	Poor
20 to 24	43.8 ± 2.3	Borderline
25 to 29	50.7 ± 2.1	Adequate
>30	78.6 ± 8.4	Very good

Results on sows

Trials results - less sow's mortality

Context:

- *Spain, 2023*
- *El Viso Farm: 900 sows*
- *Genetics: Danbred renewal (40%)*
- *Groups: 45 sows*

Trial protocol

- Period from 14/08/24 to 8/10/24 at a rate of 5 kg/t of feed
- Total number of kilos of feed: 40,000 kg
- Number of sows fed during the perinatal period (approximately 4-5 days) and lactation (25-28 days):
  - 339 sows during the perinatal period and throughout lactation
  - 36 sows during the perinatal period and the first 8 to 12 days of lactation
  - 103 sows took it during the last 10 to 15 days of lactation.

Productivity results

- Born alive = 13.9 piglets / sow
- Weaned = 11.9 piglets / sow

Trials results - less sow's mortality

	2023 without POSTBIOTIC	2024 with POSTBIOTIC
Number of dead sows	55	30
Postbiotic cost / period	1240 €	
Cost of a dead sow	500 €	
Total loss cost for the period	27 500 €	15 000 €
Net profit on the period	11 260 €	

-45% of mortality

No changes were observed in weaned piglets (lower maternal mortality) as the treatment duration was short and no neonatal diarrhoea problems were observed for less than 48 hours.

Postbiotic benefits

Postbiotic

Sow

→ Better **transit**
→ Lower **time of delivery**
→ Better **IgG** content in colostrum
→ Lower **mortality**

Piglet

→ Higher ADG 0-24h = **better colostrum intake**
→ Fewer **mortality** before weaning

Pig

→ Better **Average Daily Gain**
→ Better **Feed Conversion Ratio**
→ Lower **mortality**, especially for digestive reasons