Reduction of *Salmonella* levels in an organic pig farm by probiotic supplementation

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Introduction

Hindgut pathogens as *Salmonella spp.* are commonly carried by fomites in organic open farm environments and are pathogenic in the cecal-colonic intestinal segment. Combined with Public health restrictions, this has significant economic impact in organic pig production with limited access to treatment by antimicrobials. A *Salmonella* control program with a probiotic strain of *Clostridium butyricum* (Miya-Gold®) has previously been described in a conventional pig farm (1). This case report describes a *Salmonella* control program in an organic pig farm with clinical dysentery. *Clostridium butyricum probiotic* strain provides an anaerobic environment in the caecum-colon intestinal segment (2) supporting the development of a healthy microbiome, while inhibiting the growth of pathogenic populations.

Materials and Methods

An organic pig farm with clinical bloody and mucous diarrhea, diagnosed *Brachyspira hyodysenteria* positive by PCR, and with a high seroprevalence of *Salmonella* in carcasses (*Salmonella* level 2, index >40) was enrolled in a program with Miya-Gold®-O supplementation at 1 kg per tonne of feed from 10- 40 kg and 0,5 kg per ton of feed from 40 kg till slaughter. All pigs received one batch of antibiotic treatment (lincomycin-spectinomycin) at entry (at 10 weeks of age) during 5 days. As per organic label rules, no further treatment was possible. Despite antibiotic treatment mucous diarrhea was present at entry. *Salmonella* serum titers were monitored before and after the probiotic inclusion (Table 1).

Table 1. *Salmonella* index evolution

	Month	Samples	Positive	*Salmonella* index (level 2 > 40)	*Salmonella* level
Miya-Gold® –	January	5	3	32,3	1
	February	6	4	54,2	2
	March	5	1	62,5	2
	April	14	7	33,3	1
	May	6	2	49,3	2
Miya-Gold® +	June	5	1	36,7	1
	July	7	2	31,1	1
	August	7	2	28,2	1
	September	7	0	27,6	1

Results

The prevalence of *Salmonella* seropositive samples was 47% from January till May (17 weeks, 1301 pigs), when the program was started. From June till September the prevalence of *Salmonella* seropositive samples dropped to 20% after supplementation in the full growing period (17 weeks, 1565 pigs), (P=0,03 Fischers exact test, 2 tailed) (3) (Table 2; Figure 1). Clinical diarrhea was still present but without mucus and blood, and with lower prevalence.

Table 2. *Salmonella* serum titers

	Miya-Gold® +	Miya-Gold® –
***Salmonella* Positive +**	5 (0,20)	17 (0,47)
***Salmonella* Negative –**	21 (0,80)	19 (0,53)
Total	26	36

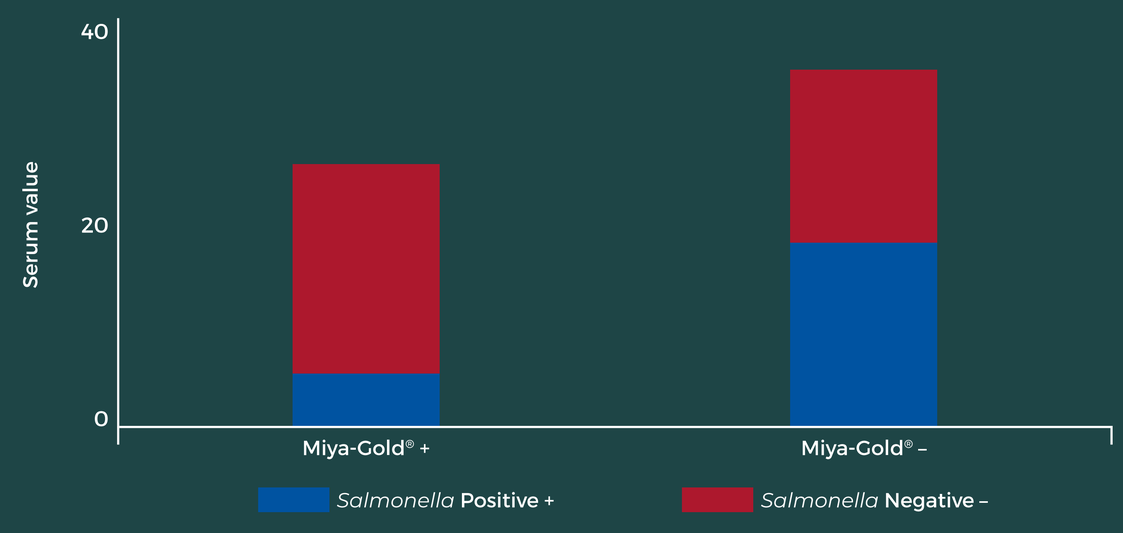

Figure 1. *Salmonella* serum values

Discussion and Conclusion

Inclusion of Miya-Gold®-O lowered the risk of a carcass being classified *Salmonella* seropositive (OR=0,27). The clinical score of feces improved.
This case describes a consistent stabilizing effect of Miya-Gold®-O on gut health creating a less favorable environment for *Salmonella spp.*

Acknowledgments

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References

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[2]Rivera-Chavez F *et al.*: Depletion of Butyrate-Producing *Clostridia* from the Gut Microbiota Drives anaerobic Luminal Expansion of *Salmonella*. Cell Host Microbe 2016, 19(4):443-454.
[3]Microsoft Excel 2016