Farm economics of the use of a *Salmonella* Typhimurium vaccine in farrow-to-finish pig farms

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Introduction

Salmonella **Typhimurium causes subclinical infection in pigs and it has been associated with decreased production parameters. Vaccination in piglets with a live attenuated *Salmonella* Typhimurium vaccine has proved its value by reducing *Salmonella* prevalence, decreasing transmission on pig farms and improving technical parameters.**

Conclusions

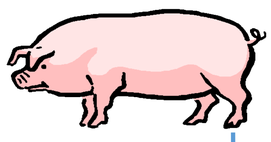
- **Vaccination with a live attenuated *Salmonella* Typhimurium vaccine increases the gross margin per average present pig in the farrow-to-finish pig farms.**
- **More research is warranted to validate the results.**

Objective

Estimating the economic impact of the use of vaccination as intervention strategy to prevent *Salmonella* infections in farrow-to-finish pig farms.

Materials and Methods

Field trial



3 herds

62 sows
N=709 piglets

Randomization

3 days

24 days

Oral vaccination
n = 30 litters
n=347 piglets

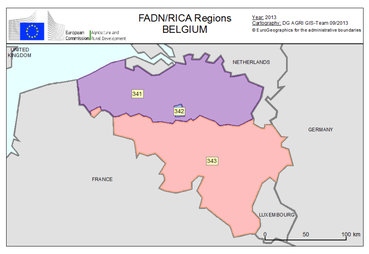
enrolment

control
n=32 litters
n=362 piglets

Slaughter

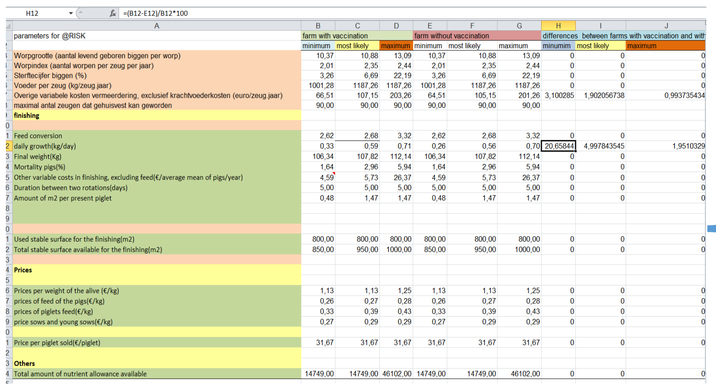
Stochastic prices

- **Pigs**
- **Feed**



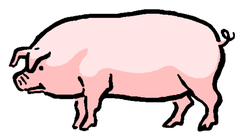
Construction of 13 virtual but representative farms, based on technical and farm structural parameters, using the FADN database

Stochastic farm simulation model



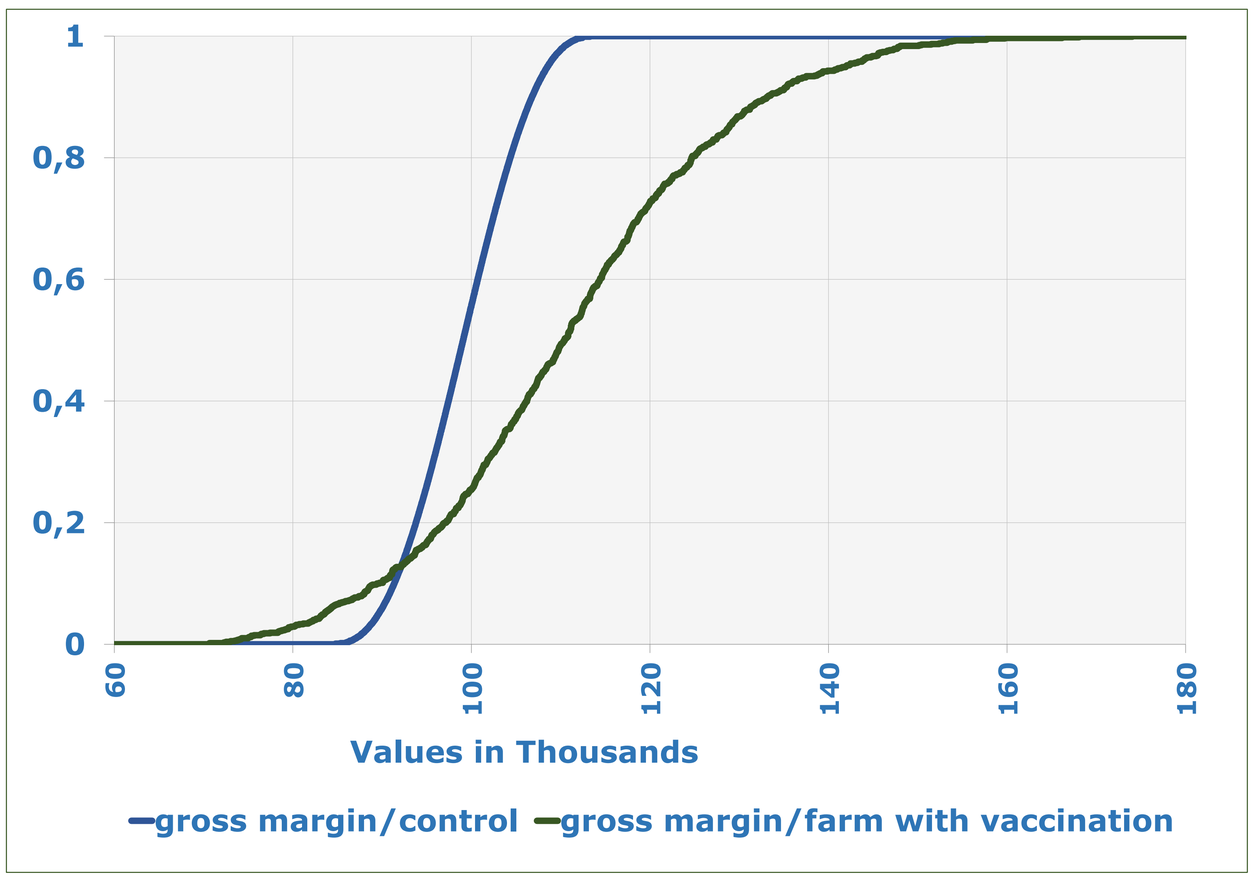
parameters for @RISK	farm with vaccination			farm without vaccination			differences	between farms with vaccination and with
	minimum	most likely	maximum	minimum	most likely	maximum	minumim	most likely	maximum
Worpgrootte (aantal levend geboren biggen per worp)	10,37	10,88	13,09	10,37	10,88	13,09	0	0	0
Worpindex (aantal worpen per zeug per jaar)	2,01	2,35	2,44	2,01	2,35	2,44	0	0	0
Storflecijfer biggen (%)	3,26	6,69	22,19	3,26	6,69	22,19	0	0	0
Voeder per zeug (kg/zeug jaar)	1001,28	1187,26	1187,26	1001,28	1187,26	1187,26	0	0	0
Overige variabele kosten vermeerdering, exclusief krachtvoederkosten (euro/zeug jaar)	66,51	107,15	203,26	64,51	105,15	201,26	3,100285	1,902056738	0,993735434
maximal antal zeugen dat gehuisvest kan geworden	90,00	90,00	90,00	90,00	90,00	90,00			
finishing									
Feed conversion	2,62	2,68	3,32	2,62	2,68	3,32	0	0	0
daily growth(kg/day)	0,33	0,59	0,71	0,26	0,56	0,70	20,65844	4,997843545	1,9510329
Final weight(kg)	106,34	107,82	112,14	106,34	107,82	112,14	0	0	0
Mortality pigs(%)	1,64	2,96	5,94	1,64	2,96	5,94	0	0	0
Other variable costs in finishing, excluding feed(€/average mean of pigs/year)	4,59	5,73	26,37	4,59	5,73	26,37	0	0	0
Duration between two rotations(days)	5,00	5,00	5,00	5,00	5,00	5,00	0	0	0
Amount of m2 per present piglet	0,48	1,47	1,47	0,48	1,47	1,47	0	0	0
Used stable surface for the finishing(m2)	800,00	800,00	800,00	800,00	800,00	800,00	0	0	0
Total stable surface available for the finishing(m2)	850,00	950,00	1000,00	850,00	950,00	1000,00	0	0	0
Prices									
Prices per weight of the alive (€/kg)	1,13	1,13	1,25	1,13	1,13	1,25	0	0	0
prices of feed of the pigs(€/kg)	0,26	0,27	0,28	0,26	0,27	0,28	0	0	0
prices of piglets feed(€/kg)	0,33	0,39	0,43	0,33	0,39	0,43	0	0	0
price sows and young sows(€/kg)	0,27	0,29	0,29	0,27	0,29	0,29	0	0	0
Price per piglet sold(€/piglet)	31,67	31,67	31,67	31,67	31,67	31,67	0	0	0
Others									
Total amount of nutrient allowance available	14749,00	14749,00	46102,00	14749,00	14749,00	46102,00	0	0	0

- **gross margin/pig**
- **gross margin/farm**



Preliminary results

Vaccination presented a higher gross margin than the control farms in 13 typical farrow-to-finish pig farms.



Cumulative distribution of the gross margin of the 13th typical farrow-to-finish control and vaccinated pig farm

Comparison of the mean gross margin and S.D. for 13 typical farrow-to-finish farms, between control and vaccination

	vaccination		control	
Farm nº	Mean[1]	S.D	Mean[1]	S.D.
1	80.70[a]	11.30	73.98[b]	11.30
2	51.48[a]	9.48	45.12[b]	7.00
3	90.49[a]	40.87	82.67[b]	7.85
4	95.47[a]	12.50	86.73[b]	9.14
5	56.47[a]	10.44	50.27[b]	7.16
6	73.70[a]	10.58	65.35[b]	7.52
7	41.59[a]	10.26	34.83[b]	7.91
8	82.87[a]	11.77	74.98[b]	8.40
9	84.66[a]	9.44	77.42[b]	6.85
10	70.27[a]	10.13	64.12[b]	7.95
11	18.11[a]	8.91	14.02[b]	6.95
12	25.11[a]	10.13	20.18[b]	7.73
13	70.01[a]	10.64	62.49[b]	7.84

[a,b] Cells with a different superindex differ significantly p<0.05
[1]mean in €/average present pig/year

Limitations

- **Market effects are not explicitly modeled**
- **A change in feed conversion is expected but was not measured in the field experiment**