

# Agenda: Feed effect

- 2 Danish trials
  - Additives
  - Concepts
- Protein level
- Protein ingredients
  - Soy products
  - Plasma
- Minerals
  - Calcium (chalk)
  - Sodium and chloride
- Acids

# Feed must promote a healthy gut

- Efficient absorption of nutrients
- Functional and protective gut barrier
- Stable and favourable microbiota
- Efficient gut immune system
- Minimum activation of stress response
- No gut diseases

(Pluske, 2017)

# Three alternative products

## commercial information

- **OceanFeed Swine:**

- Irish seaweed product, sold by Chr. Hansen
- Includes brown, red and green seaweeds
- Contains bioactive compounds (polysaccharides) such as laminarin (8.7%) and fucoidan (3.7%)
- Inhibits various microorganisms in the intestines such as enterobacteriaceae and Coli bacteria
- Protects and improves gut health
- Costs roughly GBP 0.67 per pig (7-30 kg)



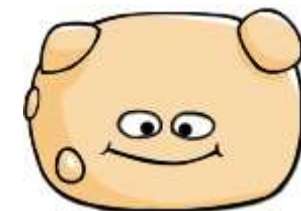
- **MiyaGold:**

- Probiotic (*Clostridium butyricum*), sold by Huvepharma
- Produces butyric and acetic acid in the intestine
- Stabilizes gut morphology and protect the gut mucosa against pathogens
- Costs roughly GBP 0.30 per pig (7-30 kg)



- **GærPlus:**

- Made of probiotic and yeast, sold by Danish Agro
- Favours the good microorganisms and inhibits the development of pathogens
- Stimulates the immune response and promotes enzyme production
- Costs roughly GBP 0.17 per pig (7-30 kg)



## Trial design (60 replicates, 4200 piglets)

Group	1	2	3	4	5	6
<b>Name</b>	Positive control		Negative control			
<b>Diet 1 (7-9 kg)</b>	2,500 Zn*	1,500 Zn*	0 Zn*			
<b>Diet 2 (9-15 kg)</b>	0 Zn*	0 Zn*	0 Zn*			
<b>Diet 3 (15-30 kg)</b>	0 Zn*	0 Zn*	0 Zn*			

\*Zn = the level of medicinal zinc added

Trial report 1101, 2017

## Trial design (60 replicates, 4200 piglets)

Group	1	2	3	4	5	6
<b>Name</b>	Positive control		Negative control	Seaweed product	Probiotic	Yeast product
<b>Diet 1 (7-9 kg)</b>	2,500 Zn*	1,500 Zn*	0 Zn*	1.5% OceanFeed Swine	2 kg/tonne MiyaGold	0.5 kg/tonne GærPlus
<b>Diet 2 (9-15 kg)</b>	0 Zn*	0 Zn*	0 Zn*	1.5% OceanFeed Swine	1 kg/tonne MiyaGold	0.5 kg/tonne GærPlus
<b>Diet 3 (15-30 kg)</b>	0 Zn*	0 Zn*	0 Zn*	1.5% OceanFeed Swine	0.5 kg/tonne MiyaGold	0.25 kg/tonne GærPlus

\*Zn = the level of medicinal zinc added

Trial report 1101, 2017

## Production results, 7-9 kg

Group (day 0-11)	2500 Zn	1500 Zn	0 Zn	OceanFeed	MiyaGold	GærPlus
Feed intake, FU/pig/day	0.31	0.29	0.25			
Daily gain, g	222	207	153			
FCR, FU*/kg gain	1.40	1.44	1.68			

**Red figures** = significantly different from 2500 Zn

\*1 FU=8.8 MJ NE or 12.2 MJ DE

**Small difference between 2500 Zn and 1500 Zn  
2500 Zn was significantly better than 0 Zn**

## Production results, 9-15 kg (corrected for weight at first intermediate weighing)

Group (day 12-27)	2500 Zn	1500 Zn	0 Zn	OceanFeed	MiyaGold	GærPlus
Feed intake, FU/pig/day	0.67	0.66	0.66	0.67	0.67	0.67
Daily gain, g	435	429	424	423	427	419
FCR, FU/kg gain	1.57	1.56	1.57	1.59	1.57	1.61

**No difference between the six groups**

## Production results, 7-9 kg

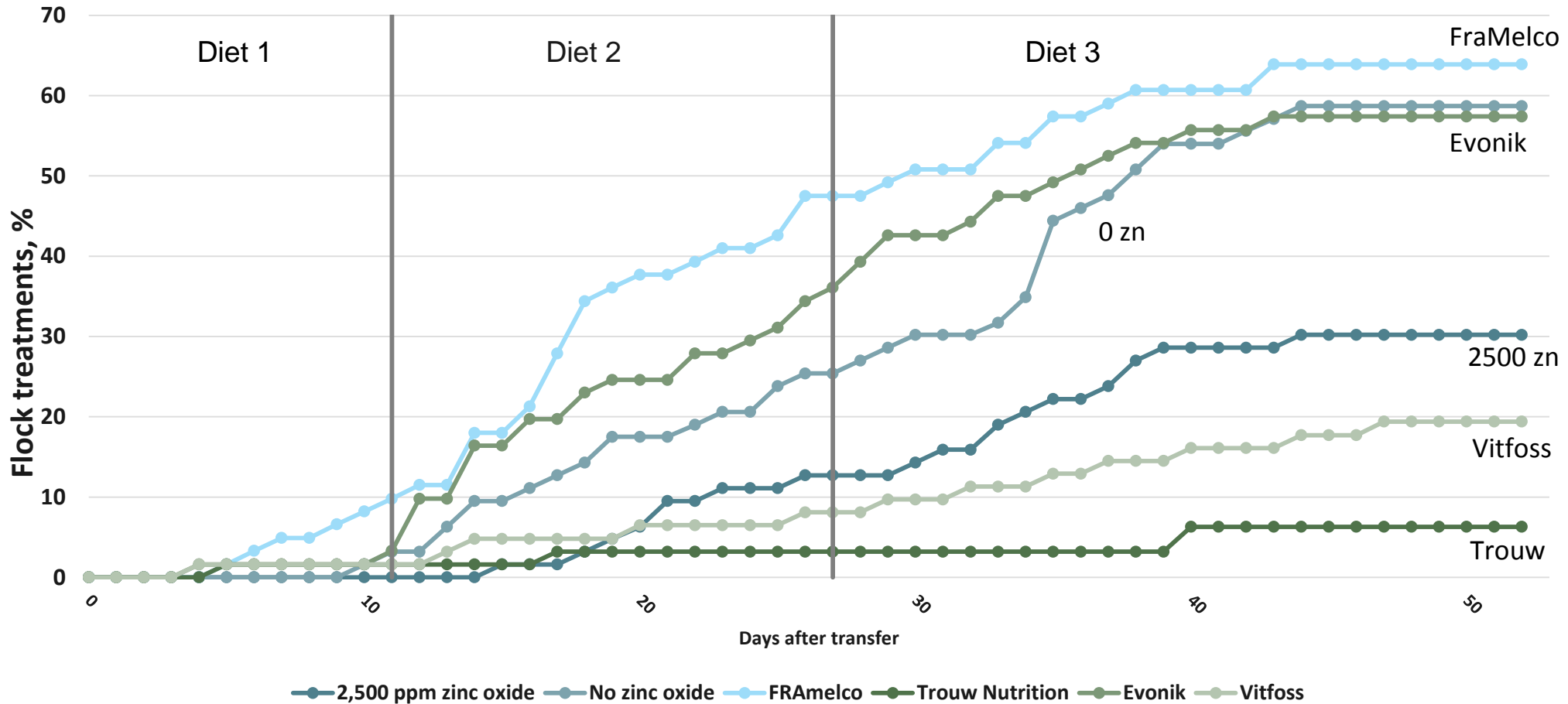
Group (day 0-11)	2500 Zn	1500 Zn	0 Zn	OceanFeed	MiyaGold	GærPlus
Feed intake, FU/pig/day	0.31	0.29	0.25	0.26	0.25	0.26
Daily gain, g	222	207	153	164	153	156
FCR, FU/kg gain	1.40	1.44	1.68	1.62	1.72	1.71

Red figures = significantly different from 2500 Zn

**No effect of the 3 alternative products compared with 0 Zn**



# % flock treatments (pens) accumulated



## Trial design (63 replicates, 4200 pigs)

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
	Positive control	Negative control	FraMelco	Trouw Nutrition	Evonik	Vitfoss
ppm Zn	2500 Zn	0	0	0	0	0
7-9 kg, diet 1	2500 Zn	0	0.4% LAC 34 0.4% C12 Dry	5% Nucleo 20% Vario	0.12% CreAmino	30% Mix 1
9-15 kg, diet 2	0	0	0.3% LAC 34 0.3% C12 Dry	5% Nucleo 8% Vario	0.12% CreAmino	17% Mix 2
15-30 kg, diet 3	0	0	0.2% LAC 34 0.2% C12 Dry	5% Nucleo	0.12% CreAmino	7.1% Mix 3
In drinking water				Selko 1.5 L/1000 L	Fecinor 50 g/1000 L	

## Production results 7-9 kg

	2500 zn	0 zn	FraMelco	Trouw Nutrition	Evonik	Vitfoss
G/day	221 <sup>a</sup>	162 <sup>b</sup>				
FU*/kg gain	1.32 <sup>a</sup>	1.58 <sup>b</sup>				

Red: worse than 2500 zn

Green: better than 0 zn

\*1 FU = 8.8 MJ NE or 12.2 MJ DE

## Production results 7-9 kg

	2500 zn	0 zn	FraMelco	Trouw Nutrition	Evonik	Vitfoss
G/day	221 <sup>a</sup>	162 <sup>b</sup>	158 <sup>b</sup>	206 <sup>b</sup>	172 <sup>b</sup>	174 <sup>b</sup>
FU*/kg gain	1.32 <sup>a</sup>	1.58 <sup>b</sup>	1.56 <sup>b</sup>	1.35 <sup>a</sup>	1.54 <sup>b</sup>	1.55 <sup>b</sup>

Red: worse than 2500 zn

Green: better than 0 zn

\*1 FU = 8.8 MJ NE or 12.2 MJ DE

## Perspective

Zinc cannot be replaced by a single compound

Effects observed in trials may be attributed to:

- Low protein content
- Combination of additives
- Low calcium content
- Amino acid profile

Zinc in weaning diet vs nutritional measures in the entire period?



# Treatments for diarrhoea

	2500 zn	0 zn	FraMelco	Trouw Nutrition	Evonik	Vitfoss
Pen treated pens, %						
7-30 kg	30.2 <sup>a</sup>	58.8 <sup>b</sup>				
Total days of treatment per pig						
7-30 kg	2.4	5.2				

# Treatments for diarrhoea

	2500 zn	0 zn	FraMelco	Trouw Nutrition	Evonik	Vitfoss
Pen treated pens, %						
7-30 kg	30.2 <sup>a</sup>	58.8 <sup>b</sup>	63.9 <sup>b</sup>	6.4 <sup>b</sup>	57.4 <sup>b</sup>	19.3 <sup>a</sup>
Total days of treatment per pig						
7-30 kg	2.4	5.2	6.3	0.6	4.9	1.5

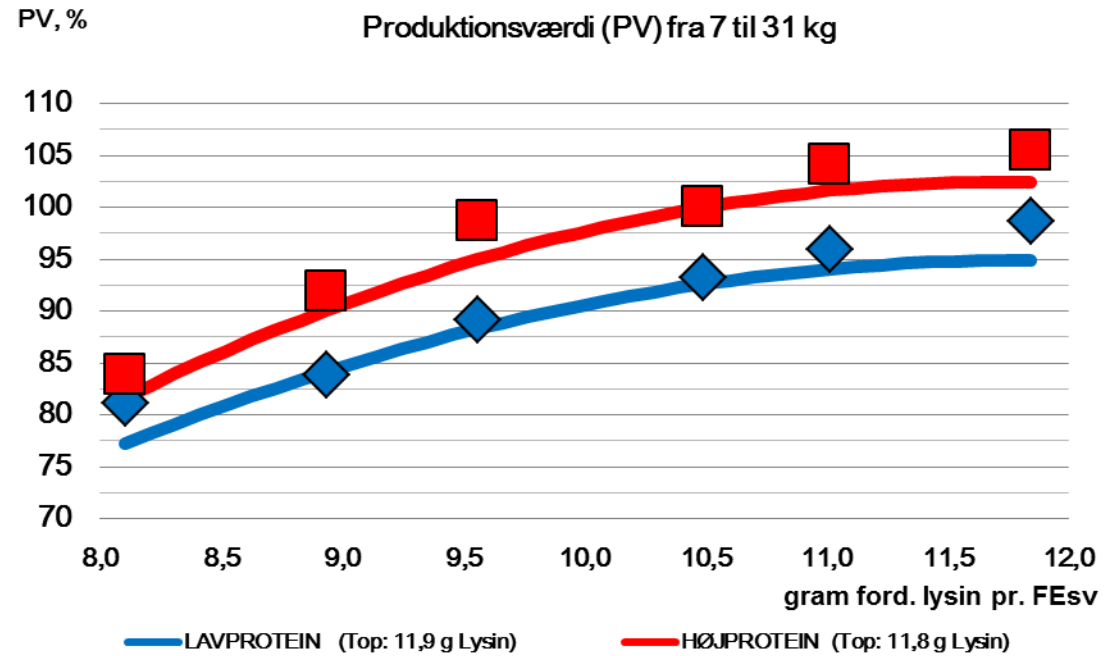
# Effect of protein level (2017)

40 replicates, 5400 piglets

7-16 kg							
Protein level (%)		18			21		
Treatment days (%)		2.0a			6.4b		
16 – 31 kg							
Protein level (%)		16	17	18	19	20	21
Treatment days (%)	LP 7-16 kg	1.2	1.6	1.2	1.6	2.4	3.6
	HP 7-16 kg	0.8	1.6	1.6	2.0	2.4	2.8
	ALL pigs	1.2a	1.6a	1.2a	1.6a	2.4ab	3.2b



# But it affected productivity



Trial report 1095, 2017

## Design of the concept test

Invitation on SEGES  
website and Pig  
Progress

Free test.  
EU approved and  
marketed products

No focus on price!!

23 applications

Evaluation board  
(four SEGES, one KU,  
one AU)

Documentation, results  
and arguments

Four concepts selected  
(+/- Zn control)

Trial at Grønhøj  
Three diets  
Six groups  
Focus after weaning