




**Weaning without zink**

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**Weaning without zinc**  
– what do we know works, and what are we testing now?




Medicament zinc

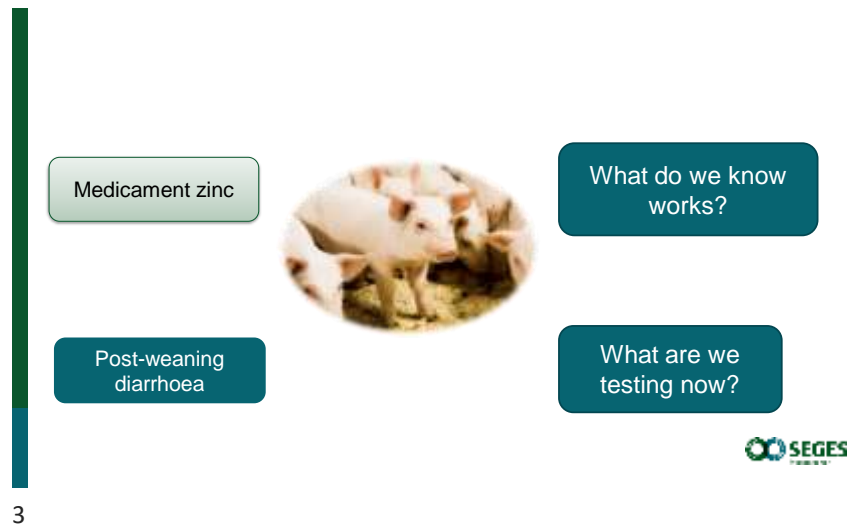
Post-weaning diarrhoea

What do we know works?

What are we testing now?



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### The use of zinc in the pig production

#### Mineral zinc

- Zinc is a vital mineral for the normal growth of pigs
- The Feedingstuffs Act allows a maximum of 150 mg of zinc per kg of feed for piglets

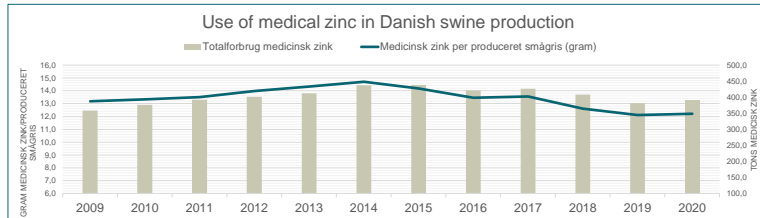
#### Medical zinc

- For the control of E. coli diarrhea in weaned pigs
- Maximum 2500 ppm per kg of feed for a maximum of 14 days after weaning
- Requires a prescription from the vet



### Zinc (oxide) must be phased out of European pig production

- European decision
  - EMA withdraws approval for Medical Zinc by June 2022
- The main argument is environmental impact
  - In addition, development of resistance
- **Reduction of antibiotic use – 2% per year from 2019 to 2022**



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Medicament zinc



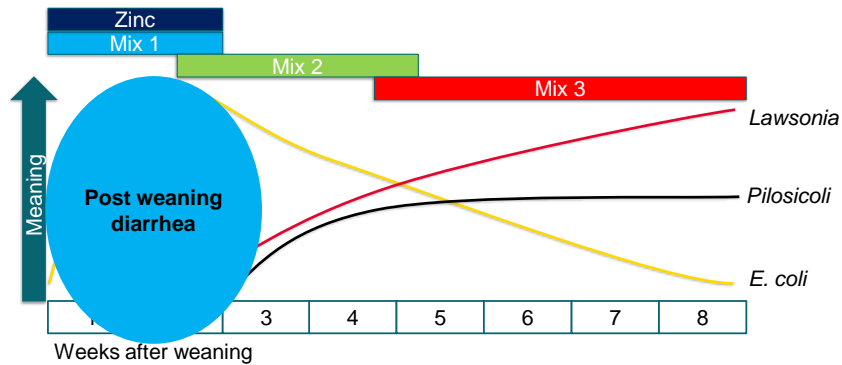
What do we know works?

Post-weaning diarrhoea

What are we testing now?



### Bowel diseases in Danish piglets

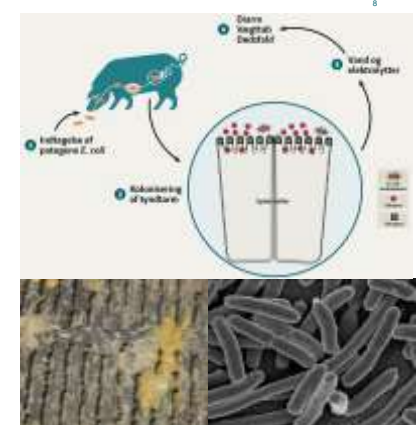


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### Post weaning diarrhoea

- Toxin-producing *E. coli* (F4/F18)
- demands multiplication
- Toxin impact of small intestine
- Exceeds capacity of large intestine = diarrhoea

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### Post weaning diarrhea

- Dehydrated piglets
- Reduced growth
- Acute deaths - up to 25% mortality
- Often seen 1-2 weeks after weaning



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### What happens when medical zinc is phased out?



**Severe disease**  
 Significant reduction in growth  
 Sudden deaths  
 Massive outbreaks of diarrhea the week after weaning  
 Acute problems are treated with antibiotics

**Manageable disease**  
 Sporadic outbreaks of diarrhea 1 to 3 weeks after weaning  
 Moderately reduced growth  
 Marginal increase in mortality  
 Disease is treated with antibiotics


**No disease**  
 Medical zinc is phased out without changes in the clinical picture

### How will it look in your herd???



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Medicament zinc



What do we know works?

Post-weaning diarrhoea

What are we testing now?







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Handling of post weaning diarrhea

**Farrowing stable** → **Weaner section**

Prevention | Reduce stress | Monitor clinical signs

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## Prevention

- Focus on well functioning sows
- Better colostrum
- More milk
- Immunization (passive/active)
  - The sow and piglet
- Feed training
- Handle other diseases
- Other diseases weaken the pig's resistability against E. coli



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## Improving the pig's immune system

- Colostrum supply
- Active immunity - Vaccines
- Passive immunity
  - Blood plasma
  - Egg-anti bodies



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## VACCINATION MED COLIPROTEC® F4/F18 MOD FRAVÆNNINGSDIARRÉ – ERFARINGER FRA 32 DYRLÆGER

Marianne Agerlin og Karina Skadborg

- In December 2020 all practising swine vets (173) received an electronic questionnaire of 15 questions
- 32 out of 173 possible answers from vets, who have experience of using the Coliprotec® F4/F18-vaccine in the Danish swine herds.



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## Reasons to start the vaccine



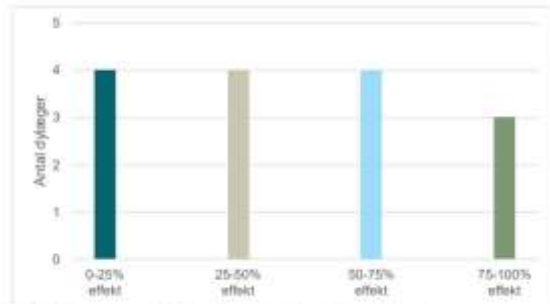
Figur 4. Årsager til opstart med Coliprotec® F4/F18-vaccine.



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### The veterinarians assessment of the vaccine effect in practice



Figur 8. Dytageles vurdering af vaccins effekt i deres landmænds besætninger.

Coliprotec® F4/F18-ordinations in 2020 – ca. 4% of all pigs



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### We know blood plasma works

	control (without zink)	2500 ppm zinc	5 % blood plasma
Days of treatment for diarrhea 7-9 kg	0,3	0,04	0,04
Days of treatment for diarrhea 7-30kg	3,5	2,9	2,8
Daily growth, g	454	477	468
Feed uoptake, FEsv/dag	0,80	0,82	0,83
Feed utilisation, FEsv/kg	1,68	1,66	1,66
Index	100	104	103
Index incl. price	100	103	98

Blood plasma was given for 14 days after weaning

Meddelelse 846, Maribo H., 2009



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### Feed training – the problem with low feed digest

- Low feed digest after weaning
  - Gives poor digest ability
  - Increases risk of diarrhea
  - Causes lower daily gain

It can take up to 48 hours before all pigs eat after weaning

- The sooner a pig eat its first meal the lower risk for diarrhea
- Remember: Pigs have to learn new eating behaviour



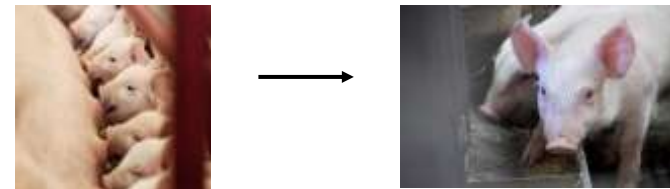
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### Concept trial of production without medical zinc

**The purpose** of this trial was to test if it's possible to make a concept based on the best experiences from herds, which have phased out the use of medical zinc.

1. Reduced mixture
2. Soaked feed before and after weaning
3. Optimized weaning feed

The effect is measured by the number of diarrhea treatments and daily gain.



SEGES  
FARMING

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Frequent feeding in the farrowing stable



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Frequent feeding in the farrowing stable



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## Results

Gruppe	Kontrol	Forsøg	P-værdi
Number of pens	48	51	
Number of pigs arriving	1.636	1.770	
Weight at arrival in weaner section kg per pig	6,3	6,5	0,334
Number of pigs at the end	1.602	1.726	
Weight day 35 after weaning, kg per pig	18,5	19,8	
Daily gain, g	350	368	0,109
Dead, %	2,1	2,5	



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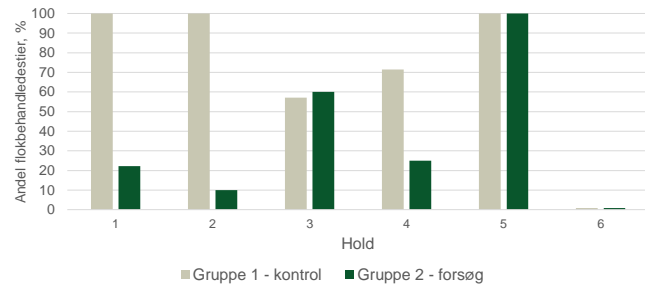
## Results - Treatments

Group	Kontrol	Forsøg	P-værdi
Group treated pens, %	77,1	29,4	0,0001
Number of treatment days per pig	3,1	0,9	<0,0001
Number of treatment days per feed day	0,09	0,03	<0,0001



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## Results - Treatments



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## Reduce stress at weaning

- Mixing pigs (age, litters)
- New infectors (influenza, coughing, etc)
- Immediate environment
- Increasing number of pigs in the pen = increasing risk of diarrhea



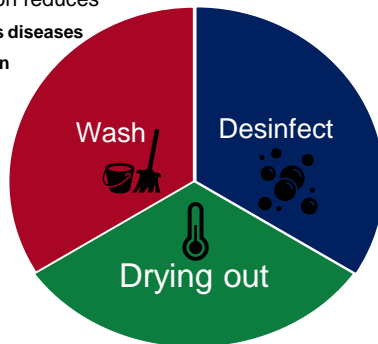
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## Preparing the stable

Thorough preparation reduces

- Spread of infectious diseases
- Pressure of infection



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## Desinfection

- Desinfection kills bacteria, virus and fungus
- Note!
  - pH
  - Temperature
  - Working time
  - Durability
  - Protection – take care of yourself!



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## Drying-out

The stable must be dry and warm when pigs are entering!

- The pigs use their body heat to dry out a humid section
- Bacteria survive well in humid environments
- A humid stable gives higher feed consumption and more diseases



Rule of thumb: The stable is dry when the temperature on the floor under the cover is 32°C



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## Optimum heat



Smågrise, to-klimastald med delvist fast gulv

Dag	1	7	14	21	28	35	42	49	56
Vægt, kg	5,5	6	7	8,5	11	15	18	25	30
Temp. u. overdæk. ° C	31-32	30-31	29-30	28-29	27-28	26-27	25-26	22-23	21-22
Gulv u. overdæk. ° C	32	32	32	32	32	Slukket	Slukket	Slukket	Slukket
Ønsket rumtemp.* ° C	25-26	24	24	23	22	21	20	19	18
Ønsket fugt** %	60	61	61	62	63	64	70	71	72



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### Enough clean water

- Easy access to CLEAN and fresh water?
- Measure the output on at least one nipple per section.
  - The output should be at least 0,6 liter per minute
- Make sure there's clean water by activating the pipes until water feels cold.
- Give water in trough/automat several times daily for the first 3-5 days



[Podcast: Rent drikkevand](#)



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### Actions on feed we KNOW are working!

- Low in protein
- Low calcium
- Organic acids
- Shape of the feed



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## Overview – Effect of reduced protein on diarrhea

## Over Norm

Niveau	1	2	3	4
Protein %	19,0			
g ford. protein/FEsv	145			
% reduktion i diarré i forhold til niveau 1				
Reduktion i PV Kr. pr. gris Samme foderpris				

Standard norm: 130-138g ford. protein pr. FEsv  
Protective diet: 118-126g ford. protein pr. FEsv

Meddelelse 1175, Kjeldsen N.J., Lynegaard J., Bache J.K. 2019 [Link](#)  
Meddelelse 1203, Kjeldsen N.J., Grove S.S., Bache J.K. 2020 [Link](#)



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## Overview – Effect of reduced protein on diarrhea

## On the Norm

Niveau	1	2	3	4
Protein %	19,0	17,5		
g ford. protein/FEsv	145	135		
% reduktion i diarré i forhold til niveau 1		20		
Reduktion i PV Kr. pr. gris Samme foderpris		1		

Standard norm: 130-138g ford. protein pr. FEsv  
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## Overview – Effect of reduced protein on diarrhea

## Protective diet

Niveau	1	2	3	4
Protein %	19,0	17,5	16,5	
g ford. protein/FEsv	145	135	125	
% reduktion i diarré i forhold til niveau 1		20	30	
Reduktion i PV Kr. pr. gris Samme foderpris		1	2,5	

Standard norm: 130-138g ford. protein pr. FEsv  
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## Overview – Effect of reduced protein on diarrhea

## Below Protective diet

Niveau	1	2	3	4
Protein %	19,0	17,5	16,5	15,0
g ford. protein/FEsv	145	135	125	115
% reduktion i diarré i forhold til niveau 1		20	30	60
Reduktion i PV Kr. pr. gris Samme foderpris		1	2,5	11

Standard norm: 130-138g ford. protein pr. FEsv  
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## Overview – Effect of reduced protein on diarrhea

### Below protective diet

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## Calcium (chalk)

- Chalk feed has a high capacity of binding acid → raises pH in the stomach → good conditions for bacteria

Calcium (g/kg)	4.9	6.4	7.8	8.8	10.8	12.0
Treatments (days/pig)	2.3	2.3	2.9	3.6	3.9	3.5
Daily gain (g/day)	606	622	619	604	610	610

**Use Calcium formate!**

**Low calcium reduces risk of diarrhea!**

**Norm: 6,0 g. pr. FEsv ved 300-400% fytase**



Medd 1139, 2018



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### The shape of the feed impacts the prevalence of diarrhea

- Roughly ground and expanded feed gives
  - 44% fewer treatments against diarrhea in piglets
  - 48 % fewer group-treated pens against diarrhea
- **Poorer productivity due to lower feed digest, lower daily gain and poorer feed conversion**

Level of medical zinc



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### Preventive actions in feeding newly weaned piglets

- Lower protein gives less diarrhea AND less growth
  - Rough feed less diarrhea AND less growth
  - Avoid extra calcium
  - Use organic acids ie. Benzoe acid and calcium formate
  - Consider blood plasma in the wening mix
- It takes time and several attempts in compositions of wening feed in each herd



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Medicament zinc

Post-weaning diarrhoea

What do we know works?

What are we testing now?

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### What are we testing now?

<p><b>Fibre sources</b>  <u>Purpose:</u>                  Testing if fermentable and non-fermentable fibres can reduce treatments against diarrhea after weaning without zinc.</p>
<p><b>New phase feeding</b>  <u>Purpose:</u>                  Investigate how phase feeding must be constructed, when we no longer are bound by shifting feed after 14 days due to medical zinc.</p>
<p><b>Healthy intestines</b>  <u>Purpose:</u>                  Testing if it's possible to use feed as treatment against post weaning diarrhea instead of antibiotics.</p>

### Get started on weaning without zinc

- **Gather a team of advisers!!**
- Review checklists
  - Management (care and administration)
  - Hygiene/Environment (washing, disinfection, temperature)
  - Age and size of the pig at weaning!!!
- Infectioner/Vaccinations
  - Coli, Lawsonia, PCV2, PRRS, influenza
- Feed/water



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### What to do as a pig producer?

- Start collecting your own experiences
- Go down to 1500 ppm – remember to have the prescription corrected
- **Make a prioritized plan of efforts**
- **Most important of all:**

- **Get started**
- **Knowledge is available**
- **Get that knowledge out working in your stables**



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**START – PARAT – KLAR**  
Er du klar til produktion uden brug af medicinsk zink senest i 2022?

*Ready – set – Go!*

Få svaret på [zinkguide.dk](http://zinkguide.dk) og se, hvor tæt du er på målet.



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**Thank you and remember!**

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