

SUCCESSFUL WEANING WITHOUT ZINC OXIDE – A DANISH PERSPECTIVE

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SIPAS annual meeting, Lazise 2022



Agenda

- Key figures Danish pig production
- The challenges and considerations around weaning
- Nutrition and feeding strategy
- Raw material and Danish recommendations
- Case study a Danish farm
- Summary

Denmark

- Key figures
- Area: 42.933 km2
- Inhabitants: 5.84 mio



Source: Google maps

Key figures sows and piglets

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Sow herds	815	710	535	570	459	537	604	629	664	749
Year sow/sow per year	812	769	791	767	742	707	680	651	640	615
Litter/year sow	2.26	2.26	2.29	2.28	2.28	2.27	2.27	2.27	2.27	2.27
Live born/litter	17.5	17.3	17.0	16.4	16.0	15.7	15.4	15.2	14.8	14.5
Dead born/litter	1.9	1.8	1.7	1.6	1.6	1.7	1.7	1.7	1.8	1.8
Weaned/year sow	33.6	33.6	33.6	32.5	31.7	30.8	30.3	29.9	29.1	28.4
Weaned/litter	14.9	14.9	14.7	14.2	13.9	13.6	13.4	13.2	12.8	12.5
Weight at weaning, kg	6.5	6.6	6.4	6.5	6.6	6.8	6.8	6.9	7.0	7.1

Production of pigs in Denmark

M head	2014	2015	2016	2017	2018	2019	2020
Slaughtering in Denmark	18.8	19.0	18.3	17.5	18.0	16.5	17.5
Export of slaughter pigs and sows	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Danish production of slaughter pigs and sows	19.2	19.3	18.6	17.7	18.3	16.8	17.8
Export of weaners	10.9	12.0	13.2	14.1	14.4	14.9	14.8
Total	30.1	31.3	31.8	31.9	32.7	31.7	32.6

Source: Danmarks Statistik

Use of antimicrobial agents 1990 - 2020



Source: DANMAP 2020

Medical ZnO in Danish pig production

- ZnO is effective to control diarrhoea
- Environmental threat
- Microbial resistance?
- A number of farmers do not use ZnO any longer
- Still many to do the exercise



A multifactorial approach

- Phasing out antibiotic growth promoters 2000 (DK) and 2006 (EU)
- Phasing out medical zinc oxide June 2022 (EU)
- The feed can not fix it standing alone
- It takes extra focus on nutrition, feeding strategy, management, hygiene, health and farm design



The challenges of weaning

- The weaning transition itself
 - Stressors
 - Away from the sow (safety and immunity)
 - New surroundings
- Potential influences:
 - Seasons (heat/cold)
 - Virus
 - Animal behaviour
 - Human factor
 - Biology



Considerations around weaning

- Reduced feed intake
 - = Damaged intestine
- Reduced villi height and increased crypt depth
 - = Reduced absorption surface
 - = Reduced growth potential
- Renewed feed intake
 - = A higher nutritional intake than the intestine can absorb
 - Excess protein results in weaning diarrhoea



Considerations when formulation feed

- Raw material (high digestibility)
- Quality of raw material
- Crude protein level
- Calcium level and source
- Acids organic acids and medium chain fatty acids
- Feed additives: Probiotics, fiber etc.



When asking Danish farmers who wean without ZnO......

- 26 farms
 - Questionare
 - Efficiency reports
 - Feed
 - Hygiene
 - Staff

Top 4 actions

- 1. Reduce crude protein
- 2. Hygiene/preparation of the barn
- 3. Easy access to feed and water and teach the pigs to eat Before weaning
- 4. Several feedings

"I'm not doing anything special"



Crude protein – a tool to handle diarrhoea

- Reduction of crude protein is well known to reduce outbreak of diarrhoea
 - Low protein level has negative impact on productivity
- Low protein level is observed to cause atrophy in intestinal villi = lack of maturation of the tissue
- Protein strategy
- Ajustment of feed according to condition of the pigs



Which raw materials?

- Considering the challenges around weaning it is important to chose suitable raw materials with high digestibility
 - Skimmed milk powder
 - Blood plasma
 - Fish meal
 - Gentle soya protein with low level of trypsin inhibitors
 - Potato protein with low level of solanin
 - Potato starch contains fibre that secures a well functioning gastrointestinal system

Danish pig producers prefer these raw materials when weaning without ZnO to achieve good performance (SEGES: Poulsen and Weber, 2020)



Danish recomendations

- In Denmark The Danish Pig Research Center (SEGES) define the rekommandations of nutrients
- Three sets of recommendations are given for protein and amino acids
 - A general set
 - A set given to minimize diarrhoea
 - A set given to accommodate higher feed utilization



Selected Danish recomendations

	6-9 kg BW***	9-15 kg BW	15-30 kg BW
Standard norm*			
Min – max (g digestible CP/ kg feed)	152-161	148-157	160-169
Lysine (g/kg)	12.9	12.3	12.9
Calcium (no phytase) (g/kg)	8.2	9.0	9.5
Gentle norm**			
Min – max (g digestible CP/ kg feed)	138-147	140-149	153-162
Lysine (g/kg)	12.3	11.8	12.3
Calcium (no phytase) (g/kg)	7.4	8.2	8.7

*at high feed utilization the recommendations are higher

** can be used to minimize diarrhoea

*** The 1st diet i particular is reduced in protein but with aditional amino acids

Mod. after Tybirk et al., 2021

Nutrient level is important but furthermore....

- Activate piglet with numerous feedings per day
- Consider weaning age
- Keep the high feed intake to avoid damage of the structure of the intestine
- Grinding: A coarser grinding can reduce treatments of diarrhoea with up to 44 % (SEGES not. 1227)
- Extra care for small piglets



Case study – Danish farmer

- Test in commercial farm
- 12500 piglets
- Multifactorial recomendations according to the Danish Pig Research Centre (SEGES) was implemented:
 - Management
 - Hygiene
 - Nutrition

6 months before intervention	6 months intervention	6 months after intervention
+ ZnO	- ZnO	+ ZnO
	+ extra hygiene	+ extra hygiene
	+ 5 daily feedings suckling piglets	+ 5 daily feedings suckling piglets
	+ 5 daily feedings weaner piglets	+ 5 daily feedings weaner piglets
	crude protein amino acids	crude protein amino acids

Case study - results

	Before (3 kg Zn)	After (0 Zn)	After with Zn
Weaned piglets/sow/year	33.5	35.6	37.9
Age at weaning	28	28	28
Weaning weight (kg)	6.6	6.25	6.2
Weight at sale (kg)	30.2	28.8	32.0
Daily gain (g)	465	472	509



Feed conversion rate (FEsv pr kg growth)



- Zinc/+actionplan

1,5 1 0,5

0

+Zinc/ - actionplan

Case study - results



Good results and productivity even without medical ZnO

+ Zinc/+actionplan

Case study treatments with antibiotics





A Danish perspective - in summary

- Multifactorial approach
- Feed solution: reduce first diet in protein and use easy digestible protein sources
- Focus on calcium level
- Correct feed and activation of piglets at weaning
- Hygiene and a correct preparation of pens
- Handling of small piglets below 6,0kg demands even more of employees and the diet



Ongoing work

- Effect of fibre types on diarrhoea
- Low protein strategy
- Effect of weaning age and feed uptage
- Different feed interventions to treat diarrhoea instead of antibiotics
- Multifactorial approach/test
- Faecal transplantation
- Vaccine against diarrhoea
- Etc.



Thank you