



Effects of gestation and transition diets on colostrum intake and piglet survival

Peter Kappel Theil, Anja Varmløse Hansen and Martin Tang Sørensen

Aarhus University, Dept. Animal Health and Bioscience, P.O. Box 50, 8830 Tjele, Denmark

Introduction

Colostrum is synthesised in the mammary glands in late gestation. During this period, the sows are commonly shifted from a gestation diet to a transition (lactation) diet. Gestation and transition diets differ typically with respect to dietary contents of starch, fiber, fat and energy. We investigated the role of gestation and transition diet composition on colostrum intake, LW gain and survival of piglets during the colostrum period.

Materials and Methods

- 48 sows were fed one of four gestation diets until d108 (Table 1)
- From d108, sows were fed one of six transition diets (Table 1)
- Piglets were weighed at birth and 24 h after onset of farrowing
- Gain of piglets 0-24 h was determined
- Colostrum intake was measured in 6 piglets per litter using D₂O dilution technique. Intake of other littermates was estimated as described by (Theil et al. (2002))
- Survival of piglets 24 h after onset of farrowing was recorded.

Table 1: Dietary ingredients and analysed chemical composition

Ingredients, g/kg	Gestation diet ¹				Transition diet ²					
	GSD	GPR	GPP	GSP	TSD	THB	TCO	TSO	TFO	TOA
Barley	440	355	163	263	387	387	328	328	328	328
Wheat	440	355	163	263	329	329	279	279	279	279
Soybean meal	62	47	154	91	223	223	278	278	278	278
DL-methionine, 40%	1	1	1	1						
Potato pulp, dry			455							
Pectin residue, dry		208								
Sugar beet pulp, dry				334						
Vegetable fat	30	17	41	29						
Animal fat					30	30				
Hydroxy methyl butyrate						0.3-0.7				
Coconut oil							80			
Sunflower oil								80		
Fish oil									80	40
Octanoic acid										40
Monocalciumphosphate	9	7	10	10	10	10	12	12	12	12
Calcium carbonate	14	7	9	6	15	15	16	16	16	16
Sodium chloride	2	2	2	2	4	4	4	4	4	4
Mineral and vitamin mix ⁴	2	2	2	2	2	2	2	2	2	2
Chemical composition, g/kg DM										
DM, g/kg	954	965	967	962	899	899	898	902	903	871
Protein	130	117	139	134	183	183	198	203	200	208
HCL-fat	62	59	58	59	72	72	105	100	103	106
Starch	519	425	304	318	446	446	388	392	401	386
Dietary fiber	171	323	404	367	170	170	161	162	163	170
(44)	(52)	(172)	(146)	(37)	(37)	(39)	(39)	(39)	(39)	(38)
Gross energy, MJ/kg DM	18.27	18.45	18.31	17.93	18.76	18.76	19.60	19.54	19.52	20.17
Fatty acids										
MCFA (C8-C14)					1	1	47			5
LCFA (C16-C22)	42	34	46	35	54	54	41	88	69	48
SFA	9	9	9	8	20	20	61	12	19	37
MUFA	9	7	10	8	18	18	10	21	32	19
PUFA	24	18	27	19	17	17	17	55	23	19

¹ GSD (Gestation Standard Diet), GPR (Gestation Pectin Residue), GPP (Gestation Potato Pulp), GSP (Gestation Sugar beet Pulp).
² TSD (Transition Standard Diet), THB (Transition standard diet + 2.5 g/d of Hydroxy methyl Butyrate as top-dressing), TCO (Transition Coconut Oil), TSO (Transition Sunflower Oil), TFO (Transition Fish Oil) and TOA (Transition fish oil + Octanoic Acid).

Conclusion

Gestation and transition diets affect LW gain, colostrum intake and mortality of piglets during the first 24 h of life. High colostrum intake is important to reduce piglet mortality.

Reference

Theil, P.K., Nielsen, T.T., Kristensen, N.B., Labouriau, R., Danielsen, V., Lauridsen, C., and Jakobsen, K. 2002. Estimation of milk production in lactating sows by determination of deuterated water turnover in three piglets per litter. Acta. Agric. Scand. Sect. A, Animal Sci., 52: 221-232.

Table 2: Effects of gestation diets on piglet performance

Gestation diet	GSD	GPR	GPP	GSP	P-value
Piglet gain 0-24 h, g/d	103 ^{ab}	133 ^a	87 ^b	122 ^{ab}	0.12
Colostrum intake, g/d	466 ^b	559 ^a	445 ^b	499 ^{ab}	0.02
Piglet mortality 0-24 h, %	3.1	2.4	3.8	2.2	0.74

Table 3: Effects of transition diets on piglet performance

Transition diet	TSD	THB	TCO	TSO	TFO	TOA	P-value
Piglet gain 0-24 h, g/d	76 ^b	132 ^a	133 ^a	125 ^a	80 ^b	119 ^{ab}	0.08
Colostrum intake, g/d	461	557	500	474	451	510	0.29
Piglet mortality 0-24 h, %	4.8 ^a	0.0 ^b	3.6 ^{ab}	5.4 ^a	3.0 ^{ab}	0.0 ^b	<0.01

Results and Discussion

- Piglet performance during the colostrum period was affected by both gestation and transition diets (Table 2 and 3).
- Sows fed pectin residue until d108 of gestation improved the colostrum intake and LW gain of the piglets. Furthermore, these piglets had a numerically low mortality.
- Feeding sows a standard diet + 2.5 g/d of hydroxy methyl butyrate (THB) or a diet containing 4% octanoic acid and 4% fish oil (TOA) during transition improved piglet LW gain and reduced piglet mortality.
- Negative linear correlations between colostrum intake and piglet mortality was observed for both gestation and transition diets (Figure 1), indicating that colostrum intake is a limiting factor for piglet survival and that nutrition during transition is important for colostrum production. High colostrum intake, piglet LW gain and low piglet mortality seem to be linked to dietary content of MCFA in transition diets.

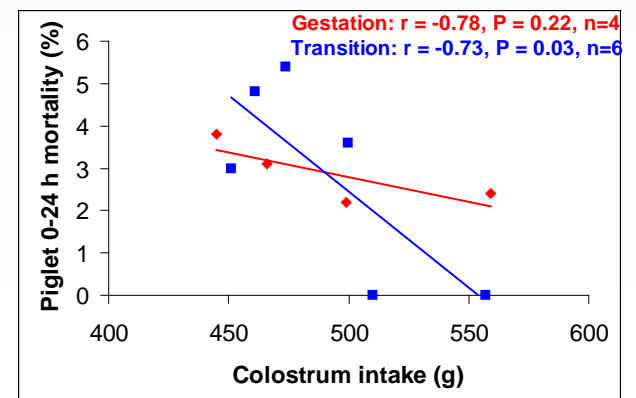


Figure 1: Correlations between colostrum intake and piglet mortality as affected by gestation (red) and transition diets (blue)