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Published in:
Manipulating pig production XIV

Publication date:
2013

Document version
Early version, also known as pre-print

Manipulating Pig Production XIV

Proceedings of the Fourteenth Biennial Conference of the
Australasian Pig Science Association (APSA)

Melbourne, Australia

24th - 27th November, 2013

Edited by Professor John Pluske and Dr. Jo Pluske

AUSTRALASIAN PIG SCIENCE ASSOCIATION (INC.)
Werribee, Victoria, Australia

Porcine colostrum supplementation increases serum immunoglobulin concentration of light piglets

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Sows are improved genetically to farrow large litters, but increased litter size leads to longer duration of farrowing and a decrease in birth weight of the piglets (Baxter *et al.*, 2013; Rutherford *et al.*, 2013). Simultaneously the concentration of immunoglobulins (Igs) in colostrum declines rapidly after birth of the first piglet (Klobasa *et al.*, 1987). As newborn piglets depend on colostrum as a source of energy and Igs for passive immunity and survival there is a risk that small and (or) piglets born later might not be able to obtain sufficient colostrum. The aim of the current experiment was to investigate if supplementing newborn piglets with porcine colostrum after birth could increase serum IgG levels of light birth weight and late born piglets. The hypothesis tested was that additional colostrum would increase serum IgG levels in the supplemented piglets.

The completely randomised experiment was conducted in one Danish piggery and included 431 live-born piglets delivered by 27 Landrace x Yorkshire sows. Litter size varied between 6 and 24 total born piglets per litter with an average of 16.0 live-born piglets per litter. At birth piglets were weighed, ear-tagged and the sex, time and birth order was recorded. Piglets with an odd ear-tag number served as untreated controls whereas even piglets were tube-fed with 25 mL porcine colostrum at 6 and 9 h after birth. The porcine colostrum originated from the same piggery and had been obtained by hand milking farrowing sows prior to the start of the experiment. Collected colostrum was bulked, stored at -20°C and then reheated to 39°C prior to use. When piglets were 24 h old a blood sample was collected via jugular vein puncture for subsequent analysis of circulating IgG using a porcine specific ELISA. Data were analysed univariately in SAS (version 9.2) using the mixed procedure with piglet as the experimental unit.

Table 1. *Effect of birth weight (BW) and colostrum supplementation (SUP) on serum IgG concentration in 24 h-old suckling piglets. Values are least-squares means.*

	Light <1.1 kg		1.1≤Normal ≤1.5 kg		Heavy >1.5kg			Significance		
	Con	Colos	Con	Colos	Con	Colos	SE	SUP	BW	SUP×BW
n	61	60	82	80	60	80				
Serum IgG (g/L)	28.4[a]	34.6[b]	34.0[b]	34.8[b]	32.9[b]	33.6[b]	1.5	0.007	0.059	0.043

[a,b]Means in a row not having the same superscript are significantly different (P<0.05); Con, untreated controls; Colos, piglets supplemented with colostrum; SE, standard error.

Table 2. *Effect of birth order (BO) and colostrum supplementation (SUP) on serum IgG concentration in 24 h-old suckling piglets. Values are least-squares means.*

	BO 1-9		BO 10 and above			Significance		
	Con	Colos	Con	Colos	SE	SUP	BO	SUP×BO
n	117	114	103	96				
Serum IgG (g/L)	33.1	36.0	31.0	32.6	1.3	0.015	0.004	0.506

Con, untreated controls; Colos, piglets supplemented with colostrum; SE, standard error.

Circulating serum IgG concentration was lower in light birth weight piglets; however, supplementation with colostrum increased the serum IgG concentration to the same levels as the normal and heavy birth weight piglets (Table 1). Serum IgG concentration was higher (P=0.004) in piglets of birth order 1 to 9 compared with piglets that were born later (Table 2). Supplementing piglets with extra colostrum increased (P=0.015) circulating IgG concentration independent of birth order (Table 2). In conclusion, supplementing newborn piglets with porcine colostrum increased serum IgG levels especially for the light piglets.

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This project was supported by the EU and Ministry of Food, Agriculture and Fisheries of Denmark Grant 3663-U-11-00183.