

WEIGHT AND AGE AT WEANING INFLUENCE PANCREATIC SIZE AND ENZYMATIC CAPACITY

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Many pig producers are moving towards early weaning in an effort to minimise disease transfer from sow to piglet. However, it is possible that the digestive function of early-weaned pigs may be immature and incapable of digesting many feedstuffs. The present study was designed to examine some of the factors that might influence pancreatic enzymic function in the weaned pig.

Forty-eight pigs (Large White x Landrace) were allocated to a 2 x 2 x 2 x 3 factorial experiment with the respective factors being; age at weaning (14 or 28 d), weight at weaning (heavy (H) or light (L)), sex (boar or gilt) and days post-weaning (1, 7 or 14 d). Sixteen pigs (two per treatment group) were weaned and fasted for 24 h prior to euthanasia. The remaining pigs were weaned into individual pens and offered a diet containing 15.5 MJ DE and 16.1 g lysine/kg *ad libitum*. Sixteen pigs were euthanased on day 7 and the remaining 16 on day 14 post weaning after a 24 h fast. Pancreatic glands were weighed and the activities of trypsin, amylase, colipase and lipase in pancreatic tissue were determined.

Table 1. Effect of sex (S), age (A) and weight (W) at weaning and days post weaning (D) on pancreas weight and units of pancreatic enzyme activity (U).

	Sex		Age		Weight			Day			sed ²	Significance
	Boar	Gilt	28d	14d	H	L	sed ¹	1	7	14		
Pancreas (g)	10.9	12.6	14.8	8.7	13.7	9.8	1.6	8.0	12.0	15.4	1.9	A***,W**,D***
<u>U per g of pancreas</u>												
Trypsin ³	11.5	15.3	20.2	8.6	15.7	11.1	0.06	9.0	14.4	17.9	0.08	A***,W*,D**
Amylase ⁴	8.18	9.86	10.3	7.77	9.74	8.30	1.42	7.42	9.83	9.82	1.71	
Colipase ^{3,4}	11.6	15.8	14.2	12.3	15.5	11.8	0.08	22.1	10.2	11.0	0.10	D**
Lipase ^{3,4}	3.61	4.70	4.73	3.58	5.13	3.31	0.09	6.10	3.40	3.38	0.11	
<u>U per pancreas</u>												
Trypsin ³	116	167	278	70.0	198	97.9	0.08	68.1	158	248	0.10	A***,W***,D***
Amylase ^{3,4}	71.3	91.4	118	55.2	110	58.9	0.09	47.3	90.8	122	0.11	A**,D**,W**
Colipase ^{3,4}	117	173	195	104	195	104	0.09	167	114	152	0.11	A**,W**
Lipase ^{3,4}	36.6	51.4	65.0	29.0	64.6	29.2	0.10	46.0	38.0	46.8	0.12	A**,W**

¹sed for main effects of sex, age and weight. ²sed for main effect of time. ³Data log-transformed for analyses, presented as geometric means and log-transformed sed. ⁴x10³.

Trypsin activity per g of pancreas was greater in pigs that were larger and older at weaning and tended to be greater in gilts than boars (P=0.055). Total trypsin activity was also greater in pigs that were older (four-fold) and larger (two-fold) at weaning and increased more than three-fold between weaning and 2 weeks post weaning. Amylase activity per g of pancreas was relatively unaffected by sex or age and weight at weaning, and so differences in total activity mainly reflect differences in pancreas weight. Colipase activity per g of pancreas was highest at weaning, possibly due to the high fat content of sows milk, and tended to be higher (P=0.097) in gilts than in boars. Likewise, lipase activity per g of pancreas tended to be highest at weaning (P=0.052). In conclusion, total pancreatic activity of most enzymes was greater in heavy and older pigs and tended to be greater in gilts than in boars, and may explain the differences in post-weaning performance observed in these classes of pigs.

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