Abstract citation ID: skad341.336

PSIII-16 Body Calcium and Phosphorus Mobilization of Sows During Lactation.

Julien Heurtault[1], Thomas Lemée[2], Marie-Pierre Létourneau-Montminy[3], Patrick Schlegel[2], [1]*Agroscope, Switzerland ; Laval University, Canada,* [2]*Agroscope,* [3]*Université Laval*

Abstract: Considering the excess of phosphorus (P) as a fertilizer in some regions, optimizing its use by animals is crucial to reduce its excretion. During the production cycle of the sow, P and calcium (Ca) requirement are greatest in lactation. To satisfy P and Ca need for milk production, sows have Ca and P available from dietary intake, but may also mobilize Ca and P from bone reserves. If that is the case, considering bone mobilization during lactation would be an opportunity to reduce dietary P intake. However, to our knowledge, bone mobilization in lactating sows is not well documented because of the difficulty in measuring it. With the use of X-ray technology to determine body composition on live animals, this subject can now be studied. Thus, the objective of this experiment was to quantify the body mineral mobilization during lactation for sows up to 3rd parity using dual-energy X-ray absorptiometry (DXA, i-DXA, GE Medical Systems, Glattbrugg, Switzerland) to obtain whole body bone mineral content (BMC) and whole-body lean and fat tissue mass. Eighteen Swiss Large White sows were scanned on day 2 and 26 (weaning) after parturition. The lactation diet was formulated to meet nutritional requirements; parity 1 [digestible energy (DE): 12.1 MJ, digestible P (DigP): 3.0 g, Ca: 9.0 g /kg], parity 2 and 3 (DE: 14.1 MJ, DigP: 2.8 g, Ca: 8.0 g /kg). Whole body P and Ca contents were calculated from lean tissue mass and BMC obtained by DXA. Bone mineral mobilization (BMC_{MOB}, g), body phosphorus mobilization (P_{MOB}, g) and body calcium mobilization (Ca_{MOB}, g) were calculated as the difference in BMC, body P and body Ca between day 26 and day 2. Piglets were weighed at farrowing and weaning and the average daily gain per piglet ($Piglet_{ADG}$, kg/d) and the birth weight of litter ($Litter_{BW}$, kg) were calculated. The mean body composition was on day 2: BMC, 5,810 ± 1082 g; P, 1,344 ± 207 g; Ca, 2,362 ± 440 g and on day 26: BMC, 5,093 ± 1,001 g; P, 1,228 ± 198 g; Ca: 2,070 ± 407 g. The $piglet_{ADG}$ was 0.24 ± 0.05 kg/d and $Litter_{BW}$ was 18.5 ± 2.47 kg. The prediction equations for BMC_{MOB} and body Ca and P during lactation are presented in Table 1. The best predictor was $Piglet_{ADG}$ and for body P, $Litter_{BW}$ also tended to be an influencing factor. This study allowed to quantify the P and Ca mobilization of the sow during lactation. Next step will be to evaluate the impact of dietary supply on this mobilization to then integrate it in requirement models.

Table 1 - Models estimating mobilization of bone mineral content[1], body Ca and body P of sows during lactation

Predicted variable	Term	Estimation	P	R^2	RSD
BMC_{MOB}, g	Intercept	-359.4	0.07	0.68	164.5
	$Piglet_{ADG}$	4427.1	P < 0.001		
P_{MOB}, g	Intercept	55.067	0.30	0.67	24.01
	$Piglet_{ADG}$	577.928	P < 0.001		
	$Litter_{BW}$	-4.233	0.09		
Ca_{MOB}, g	Intercept	-146.28	0.07	0.68	66.93
	$Piglet_{ADG}$	1801.84	P<0.001		

[1]BMC at 26th day of lactation (weaning) – BMC at 2nd day of lactation

RSD, residual standard deviation; BMC_{MOB}: bone mineral mobilization, g; P_{MOB}: body phosphorus mobilization, g; Ca_{MOB}: body calcium mobilization, g; $Piglet_{ADG}$: average daily gain per piglet, kg/d; $Litter_{BW}$: birth weight of litter, kg

Keywords: body mineral content, lactation, sow