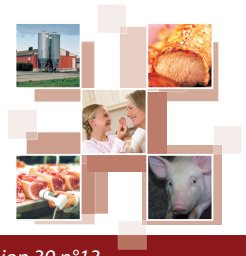
Influence of exposure time to low cadmium contamination in feed on retention in pig liver and kidney



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The presence of low levels of cadmium (Cd) in feeds can cause an accumulation in the liver and kidneys of pigs, when they are exposed over a long period of time. A study was undertaken to investigate if pigs exposed since the post-weaning period and going back to an uncontaminated finishing diet may achieved a lower Cd concentration of liver and kidneys.

Materials and methods

36 female pigs (LWxLD x LWxPiétrain; 9.3 kg and 28 d old) in a 120 d experiment (2 groups)

From 18 kg, three dietary treatments:

CL : control diets.

Cd+: contaminated diets until slaughterhouse.

Cd- : contaminated diets for 70 days, then control diet (50 d).

Pigs were successively fed *ad libitum* phase 2, growing and finishing diets.

Cd+ and Cd- diets designed to respect the regulatory limit (0.5 mg Cd /kg); Cd added as $Cd(NO_3)_2$ or by introducing contaminated wheat and sunflower meal.

Pigs in plastic and stainless steel pens.

Results

Cd contents in feeds differed slightly from those calculated because of residual Cd levels in minerals and raw materials. The final Cd dietary concentrations ranged from 0.30 to 0.54 mg Cd/kg.

The withdrawal of Cd feed resulted in a significantly lower total intake of Cd for Cd- pigs (65 ± 12 mg Cd / pig) than for Cd+ pigs (103 ± 27 mg).

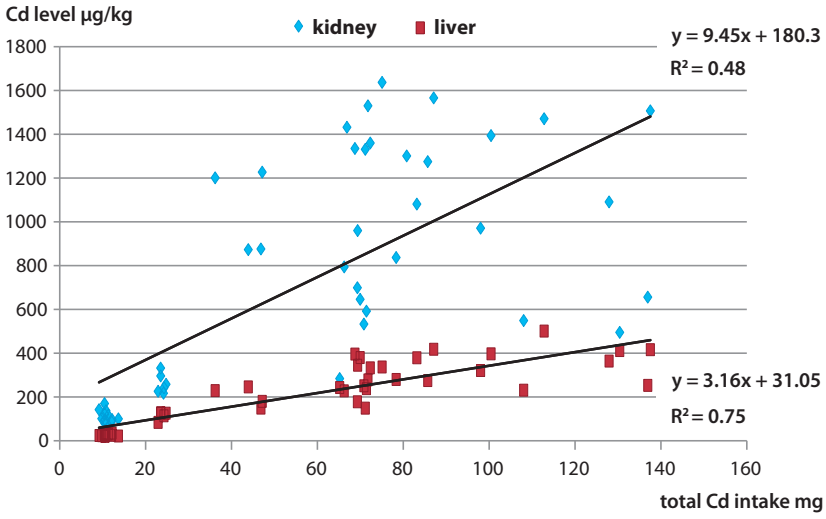
The Cd levels in kidneys were not significantly lower for Cd- pigs (896 ± 391 µg/kg) than for Cd+ pigs (1119 ± 393 µg/kg). The limited number of subjects and individual variations in Cd absorption could explain such individual variations for the Cd concentration in kidney. Some pigs fed the control feed during the finishing period had a kidney concentration above the legal limit for Cd (1000 µg/kg).

The study resulted in significantly lower Cd levels in liver of pigs fed uncontaminated feed during the final period. All exposed pigs had Cd concentration in liver below the regulatory limit.

Effect of exposure time on Cd tissue concentrations

	CL	Cd-	Cd+	RMSE	P
Time of exposure, d	0	70	119		
Weaning weight, kg	9.5	9.0	9.3	0.9	ns
Initial exposure, kg	-	18.8	18.0	2.9	ns
End of exposure,kg	-	71.7	112.5	6.5	<0.001
Slaughter weight, kg	113.9	112.9	112.5	7.8	ns
Total Cd intake, mg	17a	65b	103c	17	<0.001
Cd concentration, µg kg -1					
Liver	66a	245b	359c	62	<0.001
Kidney	182a	896b	1118b	324	<0.001
Muscle	<1	<1	<1		
Total Cd content in tissue, µg					
Liver	87a	346b	443b	124	<0.001
Left kidney	29a	138b	180b	51	<0.001

Effect of Cd intake during the fattening period on concentration in kidney and liver



Conclusion

A low Cd concentration in pig feeds results in a higher Cd accumulation in kidney than in liver. After an initial 70 days dietary exposure to cadmium, a withdrawal period of 50 days is probably too late to reduce the Cd level in the pig kidney.

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