

Adipic Acid and Benzoic Acid for Mink in the Growing Period

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Introduction

Urinary infections can be a big problem in mink farms. Especially in June and July, we find infections in the bladders of very fast growing male kits. They eat a lot of feed and thereby have a high excretion of waste products in the urine. Most often the problems stop when we start to use fish silage in the feed. The mineral acids from the fish silage are excreted in the urine, and thereby the urinary pH is lowered, crystals, if any, are dissolved and the growth of bacteria is restrained. It is recommended that the urine pH should be in the range between 6.0 and 6.6 (Case et al, 1995).

From the time when the kits start to eat and until silage is added to the feed, there might be a problem with bladder infections.

Addition of ammonium chloride lowers the urine pH, but using it daily in too high amounts might reduce feed intake (Clausen, 2000).

Adding other kinds of acids that do not influence the taste of the feed in a negative way, could be interesting.

A pilot study in the N-balance stable showed, that addition of adipic acid or benzoic acid might be a possibility (Lisbjerg, 2005).

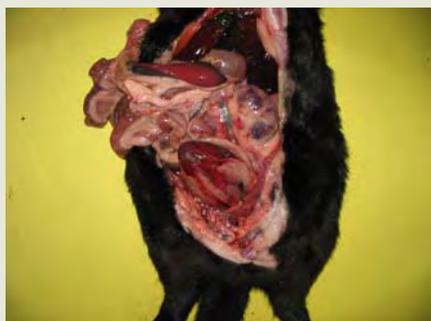
Methods

To this investigation we used three groups of siblings with 55 black male mink kits in each group.

The investigation started on July 11 and one group (CON) got control feed, one group (ADP) got feed added 0.34 % adipic acid and the last group (BEN) got feed added 0.1 % benzoic acid.

The kits were weighed on July 8, August 1, September 1, October 6 and at pelting.

Urine samples (spot-urine) were taken on July 7, July 27, August 30, October 4 and December 12.



Bladder infection in a mink kit

At pelting 15 male kits from each group were examined (siblings). Blood samples were taken for acid-base determination to see if feeding big amounts of acids had any negative consequences for the animals. The percentage of fat in the liver was determined.

Results and discussion

The weight of the male mink kits are seen in figure 1. The ADP group had a higher weight gain than the other groups from July until pelting. Also the length of the skins were better in this group. In colour, quality, density and silky skin there were no differences. However there was a difference in the number of skins with metallic, so that CON, ADP and BEN had 13.5, 6 and 0 % skins with metallic respectively.

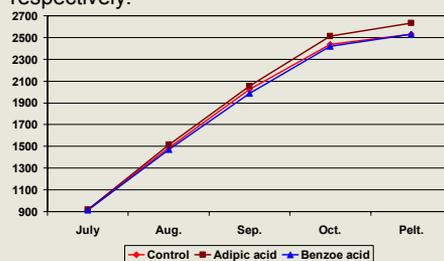


Figure 1. Weight gain during the growing period.

Only a few kits died during the growing period, Table 1. However 2 kits in the ADP group had diseases in the bladder (in August and October). By autopsy at pelting we found no abnormalities in the groups.

	Number of dead kits
CON	1
ADP	5
BEN	0

Table 1. Number of dead kits in the growing period. In the ADP group there was one kit with inflammation of the bladder, one kit with bladder stone and one kit with enlarged fatty liver.

The results of the pH measurements of the urine can be seen in figure 2. After three days there were no differences between the groups, then ADP lead to a lowering of the urine pH apart from December 2, where we saw no statistically significant difference. BEN lead to a slight lowering of the urine pH on July 27, but later measurements showed no statistically significant difference from the control group.

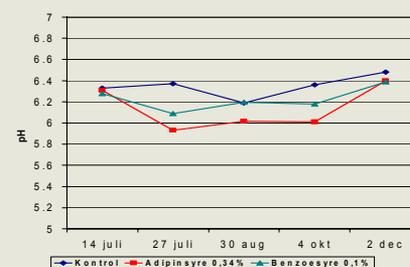


Figure 2. Urine pH during the growing period.

Some of the results of the blood samples are shown in table 2. There were no differences in the acid base balance between groups (not shown), and all values were within the normal range. Addition of these acids to the feed during the growing period had no negative effect on the acid-base balance of the kits.

	Hct	Hb	pH	Na	K
	%	mmol/l		mmol/l	mmol/l
CON	48.1	16.3	7.38	146	3.3
ADP	47.6	16,0	7.38	145	3.8
BEN	47.9	16.3	7.39	145	3.3

Table 2. Results of blood samples (15 per group) taken at pelting. Hct is hematocrit, Hb is hemoglobin, Na is natrium, K is kalium.

There were no differences between groups in the liver fat content or the relative liver weight.

Conclusion

Addition of adipic acid 0,34% or benzoic acid 0,1% in the feed for mink kits during the growing period, did not influence acid-base balance of the animals at pelting. Adipic acid gave longer skins than control kits without addition of acid and kits with benzoic acid in their feed. Compared to the control group adipic acid lowered the urine pH and benzoic acid only caused a limited, but not lasting lowering of the urine pH. In the adipic group there were most dead kits. Further investigations of adipic acid in the early growth period, is necessary before the product is recommended for use.

References

- Case, L.R., Carey, D.P & Hirakawa, 1995. Canine and feline nutrition. Cap. 32. Feline lower urinary tract disease. Mosby. 357-371
- Clausen, T.N., 2000. Ammoniumklorid til minkhvalpe 10/6 til 28/6 199. Faglig Arbejdsretning for Pelsdyrbranchens Forsøgscenter.1999. 89-91.
- Lisbjerg, S., 2006. Effekt på pH i mink urin ved syretsætning. Faglig Arbejdsretning for Pelsdyrbranchens Forsøgscenter.2005. 115-118.