

## DIETETIC HYPERTHERMIA SYNDROME IN PIGS

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During the past 10 years a sporadically occurring hyperthermia syndrome has been observed with increasing frequency in Denmark. The syndrome affecting growing-finishing pigs and sows has mainly been encountered during autumn months. The syndrome is characterized by sudden onset with a nearly 100 per cent morbidity among fatteners in 1-3 days. The affected pigs show anorexia, deep depression, recumbency, slow deep respiration and high body temperature (40.8 - 42.0 C). Except for a pale skin colour and eventually a tendency to moderate obstipation, no other clinical symptoms or changes in main blood-parameters have been found. The high body temperature and deep depression lasts for 3-4 days after which the pigs gradually recover during the next 3-4 days, with or without antibiotic treatments. Lethality has been low (0-4 per cent), however, among affected pregnant sows abortions within 3-6 days have been observed with an incidence of 15-30 per cent. Several attempts to substantiate an infection have been unsuccessful and so far the etiology is unknown. This report summarizes an outbreak in a sow-herd and a subsequent experimental reproduction of the hyperthermia syndrome in pigs.

**Case-report:** A 100 sow SPF-herd with separated modern farrowing and dry sow units received from their feeding company a new supply of sow-feedmixture on Oct. 13. Composition unchanged from previous, main ingredients: Barley and soybeanmeal. The dry sows were fed the newly supplied feedmixture from Oct. 14 to 18 and the sows in the farrowing unit from Oct. 15-18 when the feed came under suspicion and was replaced by another mixture. In the evening on Oct. 16 two dry sows were off feed. On Oct. 17 fourteen dry sows were laying down, totally apathetic with temperatures from 39.8 to 40.9 C. The following day, cases occurred among sows in the farrowing unit and Oct. 19 a total of 38 sows were affected. On Oct. 20 no further cases occurred; one affected sow aborted and the following 3 days 5 more abortions occurred. From Oct. 21 the first affected sows showed improvements and gradually all affected sows recovered. Piglets, weaners, unmaiden gilts and boars housed in the same units, but feed other rations, were not affected.

**Test-feeding experiments:** A sample (250 kg) of the suspected feedmixture was obtained from the dry feeder system in the farrowing unit of the affected herd and brought to the University Veterinary Clinic, and used in two feeding experiments - one (A) commencing 15 days after the delivery date for the feedmixture at the farm and another (B) commencing after 32 days storage of the feed.

**Feeding experiment A:** Six conventional pigs weighing 67 to 76 kg and belonging to the University were divided into two groups and placed in adjacent pens. The pigs were fed twice a day. Group 1 (3 pigs) was given a total of 6 kg of the suspected feed and group 2 (control pigs) the same amount of the usual feed. The pigs were clinically inspected and temperature recorded twice a day. Blood samples were drawn at the beginning of the experiment and every second day from appearance of symptoms. From appearance of symptoms one pig from each group was placed in the other group daily 4-6 hours between feedings. The pigs in each pen had access to common drinking-trough but not to any feed-residues. On day 14 the test-feeding was terminated and the pigs in group 1 put on normal diet.

**Feeding experiment B:** After recovery and feeding on normal diet for 5 days the group 1 pigs from experiment A were used along with the group 2 pigs in a further test-feeding experiment. All 6 pigs were given 2 kg/day/pig of the suspected feedmixture now stored for 32 days. Behaviour, feed consumption and body temperature were recorded daily for two weeks after which the experiment was terminated.

**Results:** Feeding experiment A: Day 1 to 4 pigs in group 1 only consumed 4.5 - 5 kg/day of the offered feedmixture. From day 5 they consumed the full ration offered (6 kg/day). On day 7 in the evening all group 1 pigs were quiet, laying down with temperatures ranging from 40.5 to 40.9 C. On day 8 and 9 temperature ranged from 40.4 to 41.3 C; the pigs were laying down, deeply depressed with slow deep respiration almost like anaesthetized. Blood-samples were drawn from v.cava without restraining the pigs. With support, the pigs were able to stand and to walk a few steps before laying down again. On day 11 temperature dropped to normal and the pigs showed some appetite and general improvement. The following days they remained somewhat depressed with low appetite until feed was changed to normal after which they quickly recovered. White blood-cell-count and common biochemical blood-parameters remained within normal range during the experiment.

In group 2 behaviour, appetite and body temperature remained normal during the experiment.

**Feeding experiment B:** General condition, appetite and body temperature remained normal in as well previously affected as previously non-affected pigs throughout the observation period.

**Discussion:** In the described outbreak of hyperthermia in the sow herd the morbidity was lower than we have experienced previously among fatteners where a morbidity close to 100 per cent often has been observed within 24-36 hours. The lower morbidity may in part be due to the gradual introduction of the new feedmixture and the prompt feed change when suspicion arose. Feeding experiment A shows that grain mixture may contain farmecological active components which can induce the hyperthermia syndrome in nonrelated isolated pigs. Evidence from observed herd outbreaks has indicated that introduction of barley from new harvest in pig rations could be related to the outbreaks. It is likely that toxins developed occasionally in grain during the post harvest maturing process are the cause of the described hyperthermia syndrome. The nature of such toxins is not known but apparently they have pyrogenic and anaesthetic-like properties and are probably labile. The fact that symptoms occurred in the sow herd after 2½ days feeding, in experiment A after 7½ day and not at all in experiment B indicates loss of toxigenic activity during storage of the feed for 32 days. Patho-anatomically miliary hepatic necrosis has been observed in affected pigs (1), and recently similar hepatic lesions were reported in two experimental pigs receiving blood-transfusion from a pig affected during a herd outbreak in Sweden (2). The two experimental pigs showed no clinical symptoms and whether the liver lesions are causally related to the symptom inducing toxins or to other concurrently or secondarily occurring factors is not shown. The hyperthermia syndrome per se may not be of major economical importance. However, when occurring it may possess considerable differential diagnostic difficulties in regard to several acute enzootic infections, and unless careful clinical and epidemiological examinations are performed, unnecessary, expensive mass treatments with antibiotics are likely to take place.

**Conclusion:** A dietetic hyperthermia syndrome occurs in pigs.

It can be reproduced experimentally.

It is most likely caused by a labile toxin occasionally occurring in grain.

**Selected references:** (1) Pedersen, K.B. et al.: *Vet. Rec.* 1981, 24, 537. (2) Lindblad, M. & Wierup, M.: *Svensk Vet.-Tidn.* 1982, 34, 15.