

**Brief Communication**

**SELENIUM DETERMINATIONS IN DANISH SWINE  
AFFECTED WITH HEPATOSIS DIETETICA**

Three main manifestations of selenium-vitamin E deficiency are known in swine 1) hepatosis dietetica (HD), 2) dietetic microangiopathy or mulberry heart disease (MHD) and 3) nutritional muscular dystrophy (NMD) (*Oksanen 1967, Jenkins & Hidiroglou 1972*). In practice these lesions do occur alone or in any combination.

In Denmark selenium deficiency has been proved in cattle and horses. The purpose of the present work was to examine if HD in growing Danish pigs was associated with low selenium tissue values.

The pigs were submitted to the State Veterinary Serum Laboratory for diagnostic examination. The animals came from various locations in Denmark. The age varied from 5 to about 20 weeks. The diagnosis of HD was based on macroscopic and microscopic examinations.

The selenium content in liver and heart specimens was determined and compared with the values obtained from normal pigs at 90 kg body weight. All selenium analyses were conducted in duplicate on frozen tissue samples using the fluorometric procedure described by *Olson (1969)*.

On the basis of the material submitted during the years 1971—1974 it appears that the incidence of HD was at its highest during the months October to January (Table 1).

In Table 2 the results of the selenium determinations are given together with the main points of the case histories. The body weight of the majority of pigs examined ranged from 20 to 40 kg. Often the pigs were found dead without any previous signs of disease.

Macroscopically the livers showed a characteristic mosaic pattern with red and pale lobules scattered among normal lobules. Histologically a distinct lobular distribution of the liver lesions

Table 1. Incidence of hepatosis dietetica.

Months	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Cases	15	6	6	5	8	0	3	6	6	10	22	15	102

Table 2. Clinical history and selenium concentration (p.p.m. wet weight) in liver and heart specimens from pigs with hepatosis dietetica and from normal pigs at 90 kg body weight.

Animal no.	Age weeks	History	Liver	Heart
9—74	10	Reduced appetite and sudden death	0.047	0.051
11—74	6	Of a litter of 11, 9 died. Convulsions were observed	0.031	0.025
13—74	12	Death in spite of vitamin E treatment	0.035	0.041
84—74	12—15	Apathy and sudden death (icterus observed)	0.054	0.041
87—74	10	Apathy for several days. Hemorrhagia in the skin	0.022	0.032
89—74	6	Sudden death without previous symptoms	0.036	0.036
91—74	10	Apathy, reduced appetite and slightly increased resp. rate	0.037	0.024
93—74	6	10 out of 30 swine dead. Diarrhea and anemia observed	0.197	0.151
95—74	5	4 out of 11 died in a few days. — Slight diarrhea observed	0.076	—
96—74	16	4 out of 7 swine died suddenly. Icterus	0.056	0.034
135—74	6—7	Weakness, ataxia posterior and hemorrhagia in the skin	0.146	0.110
141—74	20—24	Sudden death among apparently healthy pigs. Icterus in a few	0.081	0.016
Total (n = 12)		$\bar{x} \pm s$	0.068±0.052**	0.051±0.041**
6 months, normal (n = 7)		$\bar{x} \pm s$	0.300±0.100	0.164±0.060

was observed. Scattered lobules with hemorrhage, degeneration and necrosis were seen adjacent to lobules appearing normal. Besides the acute regressive processes lobules with reactive and reparative processes were frequently observed. Both the gross and the microscopical findings were consonant with those originally reported by *Obel* (1953).

The mean selenium concentration in liver and heart tissues of pigs with HD differed significantly ( $P < 0.01$ ) from the corresponding figures in 6-month-old normal pigs (Table 2).

*Gissel-Nielsen* (1973) pointed out that the selenium content in home-grown Danish feeding barley is often insufficient (i.e.  $< 0.030$  p.p.m.). The present data revealed a selenium deficiency in Danish pigs that had died from HD. Low selenium values in tissues from pigs suffering from HD have been reported before (*Grant & Thafvelin* 1958, *Lindberg & Sirén* 1965). The order of magnitude of the difference between the liver selenium levels in pigs dying from HD and normal pigs reported here corresponds fairly well with that found by *Lindberg & Sirén* and

very well with that presented by *Van Vleet et al.* (1970). The latter reported selenium values in 12-week-old, healthy pigs and in 6—16-week-old pigs that had died from other diseases.

It has been shown that HD and MHD can be completely prevented by treatment of both pregnant sows and their baby pigs with selenium-vitamin E preparations, 0.06 mg Se/kg b.w. as sodium selenite (*Van Vleet et al.* 1973).

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