THE INFLUENCE OF DIETARY SELENIUM ON THE PATOGENIC EFFECTS OF TREPONEMA HYODYSENTERIAE INFECTION IN PIGS.

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The previous experiments showed that a combined supplement of vitamin E (vit E) and selenium (Se) to pigs increased their resistance to swine dysentery (SD) (Teige et al. 1977, 1978). The respective roles of the two nutrients were, however, not satisfactorily elucidated by the experiments. The first experiment to be described in this report deals with this question.
Twenty-four conventionally reared pigs weighing on average 16.9 kg were purchased. They were arranged in four equal groups and fed a vit. E and Se deficient basic ration composed of dried yeast protein (15%), barley (69%), oats (13%) and a mineral and vitamin mixture (3%). The following supplements were given per pig per day; group 1: none, group 2: 200 mg α - tocopherol, group 3: 0.2mg Se and group 4: 200 α - tocopherol and 0.2 mg Se. After the pigs had been fed the different diets for 59 days they were inoculated with a pure culture of Treponema hyodysenteriae and subsequently observed for 22 days. The inoculations were followed by outbreaks of SD in all groups as judged by the clinical, bacteriological and pathological findings. The pigs which survived to the end of the observation period were slaugtered.

The results from groups 1 and 2 suggest that supplementing the pigs of group 2 with vit. E improved the weight gain and the recovery rate. The pigs of group 2 had, on the other hand, a shorter incubation period and a more severe diarrhoeic condition than animals of group 1. Vit. E seemed to have no positive influence when comparing groups 3 and 4. It is therefore suggested that this nutrient was of secondary importance as regards resistance to SD.

Only three out of six pigs in group 3 developed SD. (Table 1). This contrasts with the situation in group 1 where SD was recorded in all pigs, and in a much more severe form. The positive effect of Se supplementation was further illustrated by the average daily weight gains, which were 81 and 623 g in groups 1 and 3, respectively. A similar, although more moderate effect of Se was found when the results of groups 2 and 4 were compared. The first experiment therefore strongly indicate that Se is much more important to SD resistance than vit. E.
A second experiment was performed in order to study the effect of different levels of Se supplementation on the resistance to SD. Twenty-four conventionally reared pigs weighing on average 17.3 kg were purchased. They were arranged into four equal groups and fed the same basic ration as used in the first experiment but with an addition of 50 mg α - tocopherol per kg. The following supplements were given per pig per day; group 1: none, group 2: 0.2 mg Se, group 3: 0.4 mg Se and group 4: 0.8 mg Se. The inoculation with T. hyodysenteriae took place when the pigs had been fed these diets for 51 days. Thereafter the animals were observed for 26 days. Outbreaks of SD were seen in all groups of pigs.

The average daily weight gains are recorded in table 1. These figures also reflect the appetite in the same period. The same table also reveals the number of pigs not affected by SD and the death-losses from the disease. At the end of the observation period one pig in each of groups 1, 2 and 3 was still suffering from diarrhea. Blood stained diarrhea was found in pigs of all groups, although most frequently in groups 1 and 4.
The results showed that the pigs of group 1 suffered most severely from SD. The resistance to the disease was slightly better in group 4. With emphasis on the death-losses, weight gain and recovery rates it was suggested that the pigs of group 2 were next best when resistance to SD is concerned. The daily supplement of 0.4 mg Se per pig in group 3 was the most efficient dose in this respect. A daily dose of 0.8 mg Se had, on the other hand, a negative effect on SD-resistance when comparing the results of groups 3 and 4. This somewhat unexpected result indicates a more complex role of Se in SD-resistance than hitherto suggested.

References: Teige, J., Nordstoga, K. & Aursjø, J: Acta vet. scan. 1977, 18, 384 - 396., Teige, J., Saxegaard, F. & Frøslie, A.: Acta vet. scan. 1978, 19, 133 - 146., Teige, J., Tollersrud, S., Lund, A. & Larsen, H.J.: Res. Vet. Sci. 1982, 32, 95 - 100.

TABLE 1: Summary of clinical observations

Exp.	Group	Incubation period (days)	Not affected by SD	Death caused by SD	Average daily weight gain after infection	Days of observation after infection	Days with diarrhea
I	1	8.7	0	2	81	108	58 (54%)
	2 (+ vit. E)	6.7	0	2	216	120	71 (59%)
	3 (+ Se)	> 14.5	3	0	623	132	27 (20%)
	4 (+ vit. E + Se)	8.5	0	1	454	124	55 (44%)
II	1	> 13.8	1	3	255	109	27 (25%)
	2 (+ 0.2 mg Se)	12.5	0	1	411	142	39 (27%)
	3 (+ 0.4 mg Se)	> 21.5	4	0	606	156	14 (9%)
	4 (+ 0.8 mg Se)	> 13.7	2	3	370	118	26 (22%)