

INFLUENCE OF DIETARY VITAMIN C SUPPLEMENT ON LEG-WEAKNESS IN PIGS

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Part of the clinical leg-weakness syndrome in growing pigs manifests itself mainly by crooked and/or deviated forelegs. The symptoms which imply contracted flexor tendons and weak joint ligaments become apparent at 30-45 kg bodyweight and seem to indicate an impaired development in growing loaded connective tissues. Preliminary trials had indicated a beneficial effect of treating affected pigs orally with ascorbic acid. Among 14 severely affected 13 weeks old purebred Yorkshire pigs 7 were given vit. C orally daily for 6 weeks. And at the end of the trial 6 of the 7 treated pigs were cured or showed only slight symptoms. Among the untreated pigs 3 showed some improvement and 4 remained cripples (Nielsen 1981). The present field experiment was conducted to investigate a possible influence of a daily vitamin C supplement on the development of crooked and bended forelegs in growing-finishing pigs.

Material and Methods: The experiment was carried out in the growing-finishing units of a commercial herd with a history of a high incidence of crooked and bended forelegs among fatteners. The trial comprised 19 pens equipped for simultaneous trough-feeding of 12-14 pigs. Each pen was stocked with 10-12 pigs in the weight range 24 to 31 kg. The pigs were twice a day fed a balanced growing-finishing ration like the remaining herd and had free access to drinking water. In the growth period from approximately 30 kg to 85 kg liveweight, the pigs in every second of the selected 19 pens were given once a day a freshly prepared solution of a red coded compound in additional drinking water in the feeding trough. The pigs in the remaining selected pens were identically treated with a green coded compound. The code was not disclosed to anyone involved in the trial until its termination. The two compounds had the same high palatability, and all pigs in both groups were after a few days dosing, waiting for their supplement. Each pig in the two groups was given either 1.0 g of ascorbic acid per day or 0.8 g of citric acid per day throughout the experimental period. An individual clinical examination of the experimental pigs was performed at the beginning of the experiment and again when the pigs were at approximately 50 and 80 kg liveweight. The shape and position of the forelegs were recorded by a 4-step scoring systems (normal; grade 1: slightly bended or deviated, weak forelegs; grade 2: marked crooked and deviated forelegs; grade 3: severely crooked, deviated forelegs, pigs laying down or walking on foreknees).

Results and Discussion: Table I summarizes the highest clinical symptoms score at 50 or 80 kg. It appears that fewer pigs in the ascorbic acid supplemented group developed clinical symptoms as compared to the citric acid supplemented group. None of the experimental pigs developed grade 3 symptoms during this trial. Although, the results indicate a beneficial effect of vit. C supplements on this type of leg-weakness, the syndrome was not prevented by the used supplement. Since the application form only would allow for minor differences in the amount of vit. C consumed daily by individual pigs, relative vit. C deficiency appears not to be the only cause of this type of leg-weakness in the mentioned age group. However, an earlier occurring subclinical developmental defect in the young connective tissues can not

Table I

	No symptoms	Crooked and bended legs	
		grade 1	grade 2
Ascorbic acid (112 pigs)	70(62.5%)	33(29.4%) 42(37.5%) ²	9(8.0%) ¹
Citric acid (102 pigs)	48(47.0%)	38(37.2%) 54(52.9%) ²	16(15.7%) ¹

¹ Diff. χ^2 : 4.56 P<0.05² Diff. χ^2 : 5.15 P<0.05

be excluded. From studies in man, guineapigs and other species which are not able to synthesize ascorbic acid themselves, it is well known that vit. C is essential for the normal development and function of connective tissues, probably due to its participation in the synthesis of the two collagen amino acids, hydroxyproline and deltahydroxylysine (1). Although, pigs are a specie which genetically posses the enzyme L-gulono-lactonoxidase and thus are capable of synthesizing ascorbic acid, this does not imply that sufficient amount is synthesized in all age groups or by all genetic lines. In other species capable of synthesizing vit. C, even fatal deficiency has been encountered (2). Sows milk contains a considerable amount of ascorbic acid and although a great variation between sows has been observed (3). Newborn piglets and sucklings have a high ascorbic acid plasma level (4) which decreases towards and at weaning (5). The significance of the postweaning drop in ascorbic acid plasma level is not clear. Further studies may show whether dietary vit. C supplementation from weaning on will protect better against the described type of leg-weakness than the reported supplementation from 30 kg liveweight was found to do.

Since ability to synthesize ascorbic acid is hereditarily controlled, general supplementation of pig rations with vit. C should not be recommended in breeding herds. Such a supplementation could mask the spread of lines with a low ability or even an otherwise selflimiting fatal lack of ability to synthesize ascorbic acid, which in turn might prove to be an overall economical disadvantage to the pig industry. In production herds with some types of leg-weakness, dietary vit. C supplement may be an aid in controlling the problem.

Conclusion: In production herds with some types of leg-weakness, dietary vit. C supplement may be an aid in reducing the problem. General vit. C supplement in breeding herds is not recommended.

Selected references: (1) Fessler, J.H. and Fessler, L.I.: Ann. Rev. Biochem. 1978, 47, 129. (2) Hanssen, I. et al.: J. Nutr. 1979, 109, 2260. (3) Bowland, J.P. et al.: J. Anim. Sci. 1949, 8, 98. (4) Brown, R.G. et al.: Can. J. Anim. Sci. 1970, 56, 605. (5) Koetsveld, E.E. van: Landwirtsch. Forsch. 1968, 21, 274.