

THE BIOACTIVITY OF dl- α -TOCOPHERYL ACETATE AND γ -TOCOPHEROL IN PIGS

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Of the eight naturally occurring vitamin E compounds, γ -tocopherol is extremely widespread in nature, and in grain-based diets of pigs it is present in larger amounts than α -tocopherol. Previous studies with rats and chicks suggest that the biological activity of γ -tocopherol *in vivo* is about 10% of α -tocopherol (Bieri and Evarts, 1974). The present experiment investigated the contribution of γ -tocopherol to the total vitamin E activity for pigs.

Twenty piglets were weaned at 20 days of age. After weaning, piglets were initially fed a starter diet with no vitamin E supplement for 7 days and then, assigned to 4 experimental diet groups. They were fed a basal diet of corn starch, soyabean meal, vitamins and minerals. The diets were supplemented with no vitamin E for Diet 1, 50 ml dl- α -tocopheryl acetate/kg for Diet 2, 50 mg γ -tocopherol/kg for Diet 3 and 50 mg of each of dl- α -tocopheryl acetate and γ -tocopherol/kg for Diet 4. The pigs were housed in individual cage and offered the diets *ad libitum* for 35 days.

Pigs were bled weekly by jugular vein puncture. Thiobarbituric acid (TBA) reaction values of red blood cells were measured based on the method described by Fontaine and Valli (1977), and expressed as mmol malondialdehyde (MDA)/100 g haemoglobin (Hb) and are shown in the Table.

Diet	Day 0	Day 7	Day 14	Day 21	Day 28
1	3.15	4.81bc	13.11b	14.21c	19.47c
2	3.16	3.24a	3.64a	3.59a	3.01a
3	2.86	3.78ab	7.69a	8.90b	12.59b
4	3.61	3.31a	3.78a	3.76a	3.36a
SEM	0.266	0.405	1.759	1.076	1.447

a,b,c the means within column with different superscript differ at $P < 0.05$.

TBA reaction values were significantly greater in pigs on the basal diet than in those fed diets supplemented with different vitamin E isomers. Pigs fed the diet supplemented with γ -tocopherol alone had increased ($P < 0.05$) TBA reaction values with age, and had significantly greater values ($P < 0.05$) after 14 days of the experiment compared to pigs given the diets supplemented with both dl- α -tocopheryl acetate and γ -tocopherol or dl- α -tocopheryl acetate alone. The TBA reaction values remained constant in pigs on the diets supplemented with dl- α -tocopheryl acetate and both of dl- α -tocopheryl acetate and γ -tocopherol.

Results of the study demonstrate that dietary γ -tocopherol contributes to the total antioxidant properties of vitamin E for pigs (indicated by TBA reaction values), however, the supplemental level in the present study did not provide complete protection to the pigs against lipid peroxidation damage. According to the data of a previous study (Wang, 1992) where pigs were fed diets of a similar composition the TBA reaction value was retarded by supplementation with 11 mg dl- α -tocopheryl acetate/kg diet. If this result is compared with the present experiment, it suggests that the bioactivity of γ -tocopherol for pigs is less than 20% of dl- α -tocopheryl acetate.

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