INTERACTION OF α- AND γ-TOCOPHEROL IN PIGS

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It has been proposed that γ-tocopherol may spare α-tocopherol utilization, or there may be a synergistic interaction between these two vitamers (Bieri and Evarts, 1974). However, in a study with rats, Behrens and Madere (1987) reported that supplements of α-tocopherol decreased γ-tocopherol concentrations in rat plasma and tissues, and they suggested that the mechanisms for regulating the metabolism of vitamin E are highly specific for α-tocopherol. The present study was therefore undertaken to characterise the interaction between α- and γ-tocopherols in 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 seven days and then, assigned to four experimental diets 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 mg 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 cages and offered the diets ad libitum for 35 days.

Pigs were bled weekly by jugular vein puncture. Plasma α- and γ-tocopherol concentrations were determined by HPLC and are reported in the Table.

	Plasma α-tocopherol (mg/ml)					Plasma γ-tocopherol (mg/ml)				
Diet...	1	2	3	4	SEM	1	2	3	4	SEM
Day 0	0.43	0.33	0.42	0.43	0.042	0.07	0.06	0.06	0.06	0.003
Day 7	0.40^{a}	1.01^{b}	0.36^{a}	0.97^{b}	0.161	0.08^{a}	0.07^{a}	0.14^{ab}	0.16^{b}	0.023
Day 14	0.27^{a}	1.18^{b}	0.24^{a}	1.21^{b}	0.156	0.05^{a}	0.05^{a}	0.13^{b}	0.19^{c}	0.017
Day 21	0.24^{a}	1.68^{b}	0.30^{a}	1.91^{b}	0.182	0.02^{a}	0.02^{a}	0.17^{b}	0.22^{b}	0.026
Day 28	0.27^{a}	1.81^{b}	0.24^{a}	2.36^{b}	0.208	0.02^{a}	0.04^{a}	0.12^{b}	0.16^{c}	0.015
Day 35		2.46^{b}	0.21^{a}	2.97^{c}	0.129		0.04^{a}	0.18^{b}	0.19^{b}	0.017

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

The data show that both α- and γ-tocopherol concentrations in plasma were related to the level of dietary supplementation. Although pigs on Diet 4 were supplemented with the same level of dl-α-tocopheryl acetate and γ-tocopherol, the α-tocopherol concentrations in plasma were at less six-fold higher than those of γ-tocopherol, indicating that the absorption or the retention of γ-tocopherol by pigs is much less efficient than that of α-tocopherol. Both α- and γ-tocopherol concentrations tended to be higher in the pigs supplemented with both dl-α-tocopheryl acetate and γ-tocopherol than in those which were supplemented with vitamers separately. These results suggest that there may be a synergistic interaction between these two vitamers in pigs, in contrast to the apparent antagonism reported in rats (Behren and Madere 1987).

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