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Brief Communication

STABILITY OF α-TOCOPHEROL IN RUMEN LIQUOR OF THE SHEEP

The present work is concerned about the stability of α-tocopherol in the rumen liquor of the sheep. A previous report by *Alderson et al.* (1971) indicated that pre-intestinal disappearance of vitamin E in steers and ewes may be as much as 40 % of the administered dose; these workers also suggested that the observed losses are most probably due to metabolic destruction in the rumen and/or abomasum. Furthermore, the rate and magnitude of appearance of orally administered tocopherol into plasma of ruminants are substantially lower than those obtained with intramuscular injections (*Caravaggi et al.* 1968), suggesting that intestinal absorption of this compound is relatively poor.

In vitro stability with sheep rumen liquor was investigated in three separate experiments. The rumen liquor was obtained from sheep which had been fasted for at least 12 hrs. (the diet of the sheep contained lucerne chaff and oats 1:1 v/v). The rumen liquor was strained through surgical gauze, and 10 ml of the strained liquor was incubated with an aqueous sonicated dispersion of tocopherol (1 mg) containing 100 μC DL-α-tocopherol (5-methyl-^{3}H).

The reactions were terminated at 0 hr. (control), 4 hrs. and 24 hrs. Also included was a 24-hr. reaction in which boiled rumen liquor was used.

After incubation, water and chloroform-methanol (2:1 v/v) were added to give two phases. The organic phase containing the lipid extract was concentrated in vacuo, and the amount and distribution of radioactive components were determined by liquid scintillation spectrometry and thin layer chromatography (TLC), respectively. Chromatography on silica-gel-G plates was carried out with chloroform, and with isopropyl ether : petroleum ether (1:4 v/v) as the solvent systems. The plates were scanned using

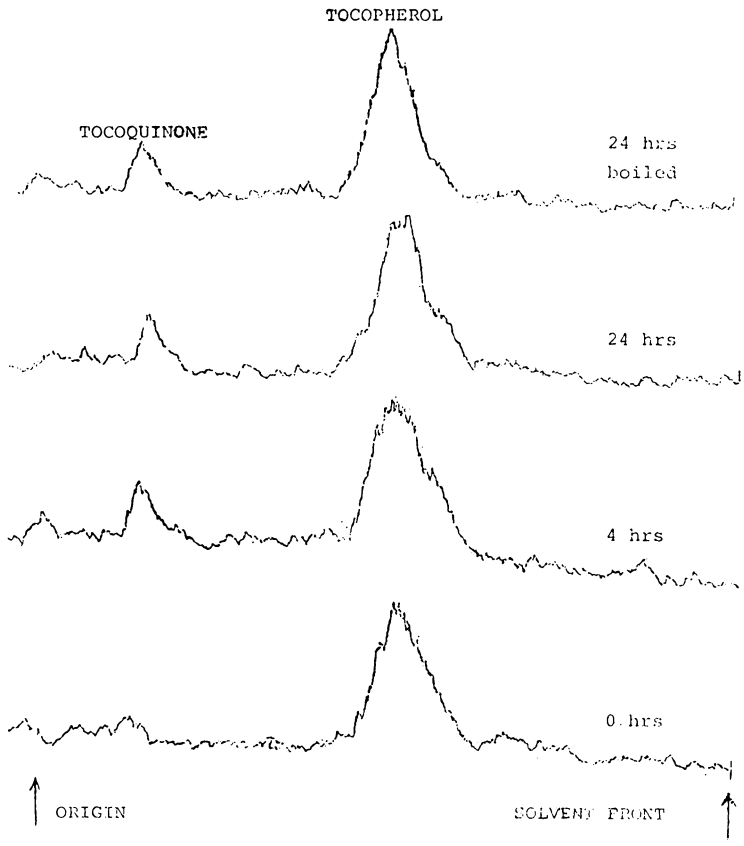

Figure 1. Radioscan of thin layer chromatographic plate showing the distribution of tritium labelled DL-α-tocopherol and tocoquinone after incubating with strained rumen contents.

a Berthold Radioactive Scanner to determine the distribution of radioactivity in the individual components.

The effect of rumen liquor upon the stability and extractability of vitamin E was very small. Radioactivities in percent of what was added, in three experiments, were 96 ± 3, 98 ± 2, 94 ± 4 and 94 ± 4 in the incubations with 0, 4, 24 hrs. unboiled and 24 hrs. boiled rumen liquor, respectively. Vitamin E is effectively extracted after incubations. The data would indicate that neither binding of tocopherol to particulate matter, nor metabolic transformation into strongly polar components has occurred during incubation.

Oxidation of vitamin E occurs readily when care is not taken against delayed processing, oxygen and light. In fact, the radioactive tocopherol used in the present studies contained approx. 13 % tocoquinone. After incubation this had increased by a further 5 % and the change was apparent in the boiled preparations suggesting that it is a chemical, rather than biological end product (Fig. 1).

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