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Influence of Vitamin E on the Utilization of Carotene from Oils

In a previous communication[1], it was indicated that the variations in growth response of vitamin A-deficient rats to carotene dissolved in different oils may be due to the difference in vitamin E contents of the oils. The effect of equalizing the level of tocopherol in the supplements has since been studied and the results found to support the explanation.

Young rats were depleted of vitamin A reserves on a diet consisting of 68 per cent sucrose, 18 per cent extracted casein, 10 per cent brewers' yeast and 4 per cent Osborne and Mendel salt mixture, and supplemented with 1 μgm. of calciferol a week. When symptoms of deficiency were observed, the rats were divided into groups and given the supplements of carotene and tocopherol, six days in the week, as stated in the accompanying table. The fæces of the rats were collected for fifteen days, and the excreted carotene determined by the method of Ramasarma and Hakim[2].

The vitamin E contents of the groundnut, olive and coco-nut oils used in the experiment, determined by a modification of Moore's procedure[3], were 386, 175 and 0 μgm. per gm. respectively. It may be seen that the total vitamin E ingested by rats in groups *G*, *O* 2 and *C* 3 was practically the same, namely, 38·6 μgm. daily, as also in groups *O* 1 and *C* 2, namely, 17·5 μgm. daily.

Group	No. of rats	Supplements	Gain in wt. 3 weeks (gm.)	Gain in wt. 5 weeks (gm.)	Carotene excreted %
G	6	1 μgm. carotene in 100 mgm. groundnut oil	16	22	7
O 1	6	1 μgm. carotene in 100 mgm. olive oil	12	16	0
O 2	6	1 μgm. carotene and 21·1 μgm. α-tocopherol in 100 mgm. olive oil	14	20	0
C 1	5	1 μgm. carotene in 100 mgm. coco-nut oil	4	7	0
C 2	6	1 μgm. carotene and 17·5 μgm. α-tocopherol in 100 mgm. coco-nut oil	9	13	0
C 3	6	1 μgm. carotene and 38·6 μgm. α-tocopherol in 100 mgm. coco-nut oil	14	17	trace

The control groups of rats given the different oils, and one group on tocopherol in coco-nut oil, declined in weight and died.

The results show that the wide variations in growth-response to 1 μgm. of β-carotene in groundnut, olive and coco-nut oils were reduced when pure α-tocopherol was added to the oils low in tocopherol, and the total intake of vitamin E thus equalized. The slight persistent difference might be due to the occurrence in the oils of other isomeric tocopherols which are more efficient antioxidants than α-tocopherol[4].

Gridgeman[5] failed to confirm the vitamin A-E synergy, but the results given above support Hickman's[6] conclusions. Experiments with other dosage levels of tocopherol are in progress.

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