

Effect of Thyroprotein upon Vitamin Content of Milk.

A. R. KEMMERER, R. A. BOLOMEY, M. G. VAVICH, AND R. N. DAVIS.

From the Departments of Nutrition and Dairy Husbandry, University of Arizona, Tucson, Ariz.

Graham¹ reported that the feeding of thyroxine to dairy cows in the declining phases of lactation caused a distinct rise in the amount of milk produced and in the percentage of butter fat. Synthetic thyroprotein (iodinated casein or protamone) has

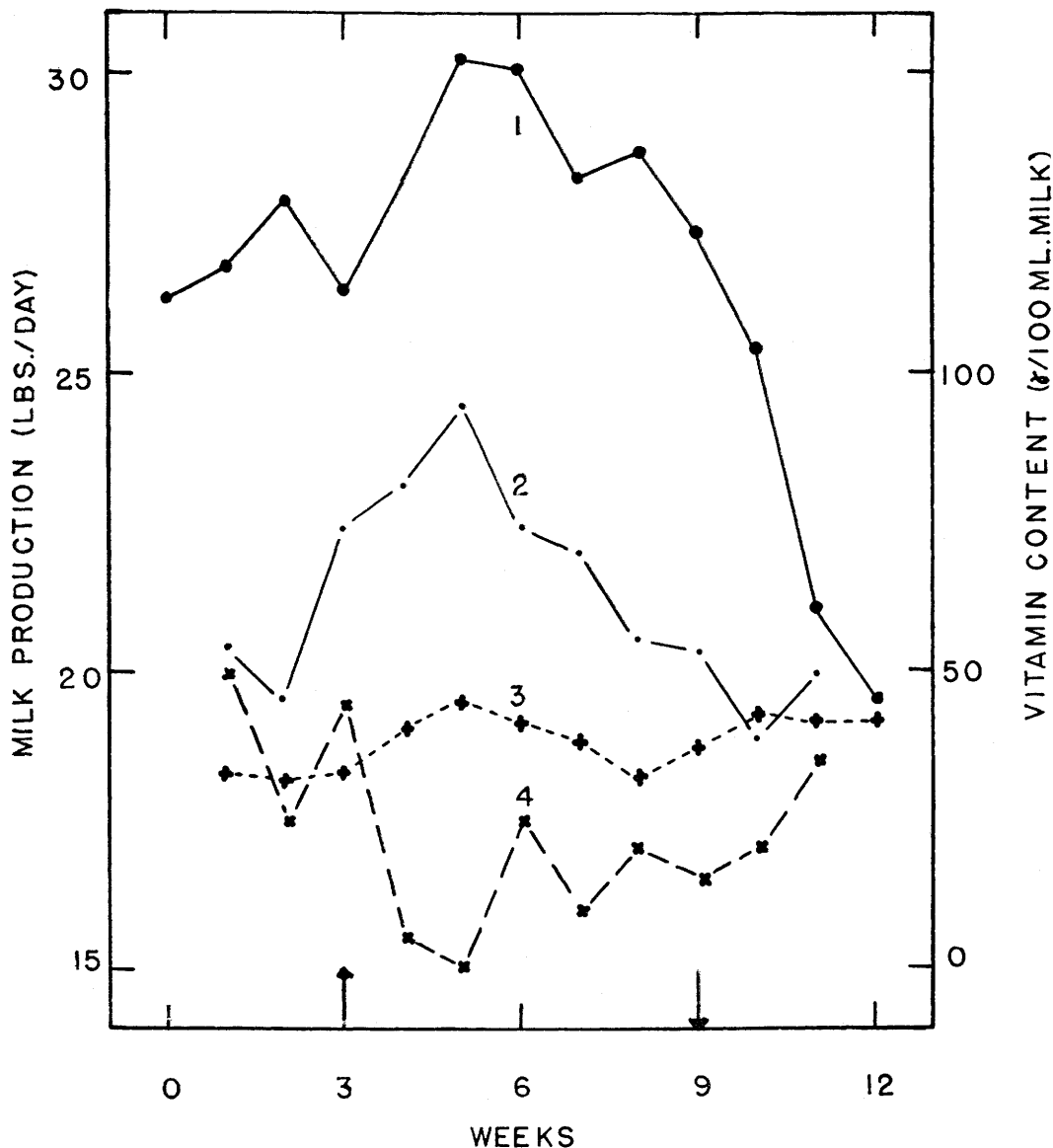


FIG. 1.

Effect of thyroprotein on milk production and on vitamin content of milk. (1) Milk production. (2) Niacin content. (3) Thiamin content. (4) Riboflavin content.

¹ Graham, W. R., Jr., *J. Nutr.*, 1934, **7**, 407.

been reported in a number of papers²⁻⁶ to produce the same effect. Van Landingham *et al.*⁶ found that feeding thyroprotein reduced the ascorbic acid content of milk approximately one-third. The present report deals with the effect of feeding thyroprotein upon the content of vitamin A, thiamin, riboflavin and niacin in milk.

Two pure bred Guernsey cows and 2 pure bred Holstein cows were fed a grain mixture supplemented with alfalfa hay. The amount of feed was kept constant for each cow during the entire experimental period of 12 weeks. At the start of the experiment the cows were fed the regular ration, for 3 weeks, then for 6 weeks the regular ration plus 15 g iodinated casein* daily, and for the remaining 3 weeks the regular ration again.

Thiamin was determined by the method of Hodson,⁷ niacin by the method of Krehl, Strong and Elvehjem,⁸ and riboflavin by the method of Hand⁹ modified according to Mc-

Laren, Cover and Pearson.¹⁰ Vitamin A and carotene were determined by the method of Berl and Peterson.¹¹

The average results obtained with the 2 Guernsey cows are given graphically in Fig 1. As in previous reports²⁻⁶ the feeding of thyroprotein caused a rise in milk production which lessened during the latter part of the period of thyroprotein feeding. In addition the concentration (γ /ml) of niacin and thiamin in the milk was increased while that of riboflavin was decreased. It is interesting that the maximum concentration of niacin and thiamin and the minimum concentration of riboflavin were reached at the peak of the milk production. The rise in thiamin content was comparatively very small and not significant. On the 12th week it was only slightly less than the peak value. The rise in niacin was comparatively large and highly significant. Curves showing the effect of the thyroprotein on the concentration of vitamin A and carotene in the milk are not included in Fig. 1 since no significant changes were observed. The results obtained with the Holstein cows closely approximated those with the Guernseys.

² Reineke, E. P., *J. Dairy Sci.*, 1942, **25**, 201.

³ Reineke, E. P., *J. Dairy Sci.*, 1943, **26**, 750.

⁴ Reineke, E. P., and Turner, C. W., *J. Dairy Sci.*, 1942, **25**, 393.

⁵ Reese, R. P., *J. Dairy Sci.*, 1944, **27**, 545.

⁶ Van Landingham, A. H., Henderson, H. O., and Weakley, C. E., Jr., *J. Dairy Sci.*, 1944, **27**, 385.

* Acknowledgment is made to W. R. Graham, Jr., Cerophyll Laboratories, Inc., for the generous supplies of iodinated casein.

⁷ Hodson, A. Z., *Food Research*, 1945, **10**, 351.

⁸ Krehl, W. A., Strong, F. M., and Elvehjem,

C. A., *Ind. Eng. Chem., Anal. Ed.*, 1943, **15**, 471.

⁹ Hand, D. B., *Ind. Eng. Chem., Anal. Ed.*, 1939, **11**, 306.

¹⁰ McLaren, B., Cover, S., and Pearson, P. B., *Arch. Biochem.*, 1944, **4**, 1.

¹¹ Berl, S., and Peterson, W. H., *J. Nutr.*, 1943, **26**, 527.

15583

Plasma Tocopherol Levels in Sprue.*

WILLIAM J. DARBY, MARY ELLEN CHERRINGTON, AND JULIAN M. RUFFIN.

(Introduced by C. S. Robinson.)

From the Departments of Biochemistry and Medicine, Vanderbilt University School of Medicine, Nashville, and the Department of Medicine, Duke University School of Medicine, Durham.

The steatorrhea of sprue is accompanied by low levels of vitamin A and carotene in

the blood plasma,^{1,2} by hypoprothrombinemia were through the Tennessee-Vanderbilt Nutrition Project.

* This work was supported by grants from Distillation Products, Inc., the Nutrition Foundation, the International Health Division of The Rockefeller Foundation, and by the Tennessee State Department of Public Health. The latter 3 grants

¹ Ingelfinger, F. J., *New Eng. J. Med.*, 1943, **228**, 180.

² Cayer, D., Ruffin, J. M., and Perlzweig, W. A., *Am. J. Med. Sci.*, 1945, **210**, 200.