of the atrophying tail. Morse, furthermore, points out that the acidosis present is sufficient to bring about autolytic reactions resulting in the atrophy of the tail. More recently, however, Helff[4] has shown that the urostyle cannot be the fundamental causative factor involved since typical tail atrophy was found to occur in animals in which the anlagen of the urostyle had been extirpated prior to metamorphosis.

The results of the present work tend to support Helff's contention. The fact that tail integument transplanted to the back undergoes normal histolysis without the presence of adjoining atrophying tissue certainly requires some other explanation. Moreover, the fact that integument from the back transplanted to the tail never undergoes histolysis during tail atrophy is a negation of the idea that tail skin undergoes histolysis during metamorphosis due entirely to its association with the atrophying musculature beneath. It is concluded that 2 factors probably determine the histolysis of tail integument, one of which lies within the skin itself and is specific, and the second, within the blood stream, which becomes functional in inducing histolysis of tail integument at a certain stage of metamorphosis.

4342

Influence of Superheating on Antirachitic Properties of Irradiated Foods.

AMY L. DANIELS AND DOROTHY JORDAN.

From the Iowa Child Welfare Research Station, State University of Iowa.

There is some evidence that superheating destroys the antirachitic effect of irradiation.[1] In order to test this point further we have compared over a period of 10 weeks the growth performance of rats which were receiving a rachitic ration[2] with that of animals receiving (1) similar rations which had been irradiated; and (2) the irradiated ration which had been subsequently superheated. This rachitic ration which consisted of a mixture of grains was finely ground, mixed with distilled water and heated until it was of a thick

[4] Helff, O. M., *Anat. Rec.*, 1928, Dec., 39.

[1] Honeywell, H. E., Dutcher, A. R., and Dahle, C. D., *J. Biol. Chem.*, 1927, lxxiv, 77.

[2] McCollum, E. V., Simmonds, Nina, Parsons, H. T., Shipley, P. G., and Park, E. A., *J. Biol. Chem.*, 1920, xlv, 333.

gelatinous consistency. Since even at 15 pounds pressure mixtures of this consistency seldom reach throughout temperatures above 97° C., it was thought that results with these rachitic rations might not be valid. Therefore, we have tested the effects of the addition to the ration of (1) boiled milk; (2) irradiated boiled milk; and (3) irradiated milk which was subsequently autoclaved.

In order to test further the effect of superheating on the antirachitic properties of milk, we have used in the rachitic ration comparable amounts of evaporated milk, as well as evaporated milk supplemented with calcium phosphate, thereby ruling out the influence of the possible calcium deficiency of the evaporated milk.

The rickets ration was irradiated in thin layers (1/8 inch) for ½ hour at a distance of 2 feet. Part of this was then autoclaved at 15 pounds for 6 hours. The milk was irradiated in ¼ inch layers for 20 minutes at a distance of 2 feet. Before autoclaving this was diluted with distilled water and heated at 15 pounds pressure for one hour.

The results of the investigation indicate that superheating, at least to the extent involved in the experiment, does not affect the antirachitic properties of food. This is shown not only by the animals which received the irradiated milks, but by those receiving the evaporated milk as well. The average gains per rat per week in the 2 groups fed the irradiated milks were comparable, and somewhat greater than those of the groups receiving the non-irradiated milks.

TABLE I.

Comparison of Growth of Animals Receiving Irradiated, and Irradiated Superheated Foods.

Ration	No. of animals	Initial weight Av.	Wt. after 10 wks. on diet Av.	Av. gain per rat per week	Remarks.
		gm.	gm.	gm.	
Control*	6	47.6	72.2	2.46	
Irradiated	2	51	151	9.8	4 females pregnant—not included.
Irradiated autoclaved	6	47	147	10.0	2 females bore young at 12 and 13 weeks respectively.
20 cc. milk boiled	6	45	101.2	5.62	One died 10th week.
20 cc. milk boiled†	6	58	115.2	5.7	One died 7th week.
20 cc. irradiated milk	6	42.3	113.2	7.13	One died 7th week.
20 cc. milk irradiated autoclaved	6	43	117.3	7.43	
10 cc. evaporated	6	52.3	134	8.2	
10 cc. evaporated+ 0.2 gm. $Ca_3(PO_4)_2$	6	46.6	150	10.36	

*The control rachitic ration used in each experiment was Ration 2249, McCollum, E. V., Simmonds, N., Parsons, H. T., *et al.*, *J. Biol. Chem.*, 1920, xl, 333. The amount of milk specified was added to 100 gm. of the ration.

†Duplicate test started when animals were older, and showing similar results.

The animals receiving the evaporated milk made even better gains than those receiving the irradiated boiled milk, due in all probability to the difference in the antirachitic potency of the original milk. The better weight gains of the animals receiving the calcium phosphate additions are in accord with theory, since in the rations insufficient milk was used to supply the optimum amount of calcium.