3. Baliga, B. R., Balkrishnan, S., Rajgopalan, R., *Nature,* 1954, v174, 35.

4. Borchers, R., Mohammad-Abadi, D., Weaver, J. W., *J. Agr. Food Chem.,* 1957, v5, 371.

5. Braham, J. E., Bird, H. R., Bauman, C. A., *J. Nutrition,* 1959, v67, 149.

6. Borchers, R., *ibid.,* 1962, v77, 309.

7. Barnes, R. H., Fiala, G., Kwong, E., *ibid.,* 1962, v77, 278.

8. Liener, I. E., Schultze, M. O., *ibid.,* 1952, v46, 223.

9. Kakade, M. L., Evans, R. J., *Fed. Proc.,* 1963, v22, 551.

10. ———, *Mich. Agr. Exp. Sta. Quart. Bul.,* 1963, v46, 87.

11. Sigh, D. K., Gupta, V. P., Das, N. B., *Ann. Biochem. Exp. Med.* (India), 1960, v20, 1.

12. Rao, T. B., Tamhane, D. V., Sreenivasan, A., *J. Sci. Indust. Res.* (India), 1962, v21C, 174.

13. Goddard, V. R., Mendel, L. B., *J. Biol. Chem.,* 1929, v82, 447.

14. Rigas, D. A., Osgood, E. E., *ibid.,* 1955, v212, 607.

15. Honavar, P. M., Shih, C., Liener, I. E., *J. Nutrition,* 1962, v77, 109.

16. Liener, I. E., *Am. J. Clin. Nutrition,* 1962, v11, 281.

17. Borchers, R., *Science,* 1953, v117, 482.

18. Carroll, R. W., Hensley, G. W., Graham, W. R., *J. Science,* 1952, v115, 36.

19. Borchers, R., PROC. SOC. EXP. BIOL. AND MED., 1963, v112, 84.

20. Hartsook, E. W., Boucher, R. V., Hershberger, T. V., *Arch. Biochem. Biophys.,* 1959, v82, 310.

21. Association of Official Agricultural Chemists, Washington, D.C., *Official methods of analysis,* 1960, 9th ed.

Received October 4, 1963. P.S.E.B.M., 1964, v115.

Raw Soybean Feeding Decreases Transamidinase Activity.* (29068)

RAYMOND BORCHERS (Introduced by John L. Adams)
Department of Biochemistry and Nutrition, University of Nebraska, Lincoln

A number of assay systems have been investigated in our laboratory in rats fed a raw soybean ration, a dietary regime which reduces the growth rate, with the hope that a more rapid assay for the "growth inhibitor" might be found. These systems have ranged from endogenous oxygen uptake through transaminases and liver protein regeneration. None of these revealed a difference between rats fed raw and heated soybean meal rations.

Walker(1) reported that creatine feeding depressed kidney transamidinase activity in rats. His data indicated that recovery of normal activity required several days after return to the stock ration. This suggested the hypothesis that a slower regeneration rate of transamidinase activity might occur on a raw soybean ration than on heated soybean. Instead of investigating the initial hypothesis, a comparison of kidney transamidinase activity was made on rats fed heated and raw soybean meal rations, without creatine pre-feeding, with the following results.

Methods and results. Weanling rats of the Holtzman strain were fed rations prepared as previously(2). Kidney transamidinase activity was represented by hydroxyguanidine formation from arginine and hydroxylamine according to Walker(1). Feeding of raw soybean meal resulted in a decrease of kidney transamidinase activity to less than 70% of that on the heated soybean meal in 4 days. The results are presented in Table I. Data were obtained on 2 additional soybean meal samples after a 4-day feeding period to 4 animals. The values were as follows from the heated and raw meal rations, respectively, on sample 2: transamidinase, 0.244 ± 0.014 and 0.182 ± 0.013 μmoles; gain, 15 ± 2 and 14 ± 3 g/4 days; and food consumption, 28 ± 0.3 and 30 ± 1.0 g/4 days and on sample 3: transamidinase, 0.224 ± 0.019 and 0.148 ± 0.002 μmole; gain, 15 ±

* Published with approval of the Director as paper no. 1391, Journal Series, Nebraska Agri. Exp. Station. This work was supported in part by Public Health Service grant.

TABLE I. Kidney Transamidinase Activity in Rats Fed 25% Soybean Meal Rations.

Days on ration	Hydroxyguanidine formed: Heated soybean ration	Raw soybean ration	%
	(μmoles/min/g wet kidney)		
1	.19	.17	89
2	.22	.20	91
3	.22	.16	73
4	.20	.13	65
6	.20	.14	70
12	.22	.15	68
18	.19	.13	68

Transamidinase activity represented by hydroxyguanidine formation from arginine and hydroxylamine according to Walker(1). Each value represents the average of 2 female and 2 male rats. Standard error of each group ranged from ± 0.01 to ± 0.03.

1 and 11 $\pm$ 2 g/4 days; and food consumption, 29 $\pm$ 1.4 and 24 $\pm$ 1.5 g/4 days.

Discussion. The lowered transamidinase activity does not represent a generalized decrease of tissue enzymes since previous studies of several enzyme activities have revealed no differences. Muscle creatine and urinary creatinine excretion have also been observed in our laboratory to be similar. Presently, no explanation for the lowered transamidinase activity after raw soybean feeding can be offered. The effect is being used as a "rapid" assay in fractionating raw soybeans for a "growth inhibitor." Those fractions which reduce the kidney transamidinase activity after feeding are further tested for effects on the growth rate of weanling rats.

Summary. The kidney transamidinase activity of weanling rats fed raw soybean meal rations was reduced to approximately 70% of control animals fed heated soybean meal rations. This reduced activity was attained in 4 days feeding and remained at this level for the remainder of the feeding test.

1. Walker, J. B., *Biochim. et Biophys. Acta,* 1958, v36, 574.

2. Borchers, R., Mohammad-Abadi, D., Weaver, J. M., *J. Agr. Food Chem.,* 1957, v5, 371.

Received October 28, 1963. P.S.E.B.M., 1964, v115.

A Coprophagy-Preventing Metabolism Cage for Mice or Hamsters. (29069)

H. H. DRAPER AND A. F. ROBBINS

Division of Animal Nutrition, Animal Sciences Laboratory, University of Illinois, Urbana

The demonstration that coprophagy is extensively practiced by the laboratory rat(1) indicates that the results of many studies of dietary requirements, intestinal absorption and pathways of excretion pertaining to rodents have been influenced by this factor. For example, it has been shown that the ability of the rat to thrive on a diet deficient in Vit. K depends upon its having access to those amounts of this nutrient which are synthesized by intestinal microorganisms and excreted in the feces(2). Several devices for preventing coprophagy by rats have been proposed, including the use of tail cups(1) and circular or tubular cages(3,4). The problem is more difficult to resolve in mice because of their smaller size; however, during a study of the intestinal absorption of calcium by this species, an inexpensive metabolism cage was devised which satisfactorily prevented coprophagy and afforded a quantitative separation of feces and urine. A description of this apparatus is given herewith.

Procedure. The components of the metabolism cage and their specifications are outlined in Fig. 1 and a photograph of the assembled unit is shown in Fig. 2. The cage consists essentially of 2 concentric pyrex rings, 110 mm and 50 mm in outside diameter, respectively, and 1.25 in wide, cut from standard tubing, which are held in position between 2 pieces of quarter-inch stainless steel wire mesh. The pieces of wire are 15 cm square