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STUDIES ON VITAMINS B AND G

J. F. FEASTER AND V. E. NELSON

Considerable data have accumulated during the last decade on the role of diet in reproduction and rearing of young. The problem is an important one and merits careful consideration, because of the relation between the results on animal experiments and infant mortality and failure of milk secretion in the human and domestic animals.

It is well known at the present time that a specific vitamin is required for reproduction. Evans and Bishop (1) were the first to announce the existence of vitamin E. Several articles have been published from this laboratory on the relation of diet in reproduction and rearing of young; and the work in this paper is a continuation of those studies. The experiments recorded in this article have for their essential purpose a study of the dietary factors required for lactation—both from a qualitative and quantitative standpoint. The effect of the following substances on lactation was studied: oatmeal, yellow corn, white corn, barley, wheat, rice polishings, wheat germ, rice bran, and corn germ.

All of the experiments were performed on rats. The basal food mixture had the following composition: casein 18 per cent, salt mixture 185 (2) 3.7 per cent, butter fat 4 per cent, codliver oil 1 per cent, substances tested from 10 to 60 per cent, and the remainder of the ration to 100 per cent was composed of dextrin. Casein was purified by washing with water acidified with acetic acid. Dextrin was made by moistening starch with 1 per cent of citric acid and autoclaving at 15 pounds pressure for three hours.

The data are given in the tables. Table I gives the results obtained on lactation by feeding the different substances at different levels as the sole sources of vitamins B and G. Female rats were given the rations immediately after the birth of the young, and the effects on growth and development of the offspring were noted.

In the first column of Table I is given the nature of the food as the sole source of vitamins B and G, and the level at which it was incorporated in the basal food mixture. The mortality on the different rations was high, ranging from 16.6 per cent on 60 per cent of oatmeal to 72.2 per cent on 60 per cent of yellow corn. There was also a marked difference in the weaning weights of the

Table I—Lactation on Diets Containing Various Seeds and Products from Seeds

SOURCE OF VITAMINS B AND G	No. OF LITTERS	No. OF YOUNG	No. OF YOUNG WEANED	AVERAGE WEANING WEIGHT	PER-CENTAGE MORTALITY
Oatmeal	60	8	48	45.2	16.6
Yellow corn	60	12	72	36.0	72.2
White corn	60	12	72	41.1	62.5
Barley	60	12	72	38.1	34.7
Wheat	30	6	36	34.2	55.5
Rice polishings	10	12	72	39.5	30.6
Wheat germ	10	12	72	47.4	62.5
Rice bran	10	12	72	46.7	44.4
Corn germ	10	12	72	22.5	48.6

young, varying from 22.5 gms. on 10 per cent of corn germ to 47.4 gms. on 10 per cent of wheat germ as the sole sources of vitamins B and G in the rations. The weaning weight was calculated at 28 days.

Table II gives an explanation for the high mortalities observed in Table I; the first column gives the source of vitamins B and G in the basal food mixture. The various foods in Table I were supplemented with autoclaved yeast in order to enhance the vitamin G content of the rations; the autoclaved yeast was prepared by placing moistened yeast in layers about one inch deep in granite pans and autoclaving for 6 hours at 15 pounds pressure. Table II shows that autoclaved yeast markedly reduces the mortality on all of the rations and, in all cases, raises the weaning weight of the young. In the case of corn germ, however, the addition of 10 per cent of autoclaved yeast as a source of vitamin G did not result in such marked improvement as in the other experiments.

It is evident from results in Tables I and II that autoclaved yeast supplies something—very likely vitamin G—which enhances lactation in rats receiving the various seeds and products from seeds as the sole sources of vitamins B and G. It is possible that G is not the only deficiency and that lack of other unknown substances may be a contributing factor. Extracts were therefore made of vitamin G and of vitamin B in order to ascertain if these extracts would do the same as autoclaved yeast. The results are shown in Table III for yellow corn and wheat as the sole sources of vitamins B and G. Fraction 8 B is a 95 per cent alcoholic extract of rice polishings adsorbed on Fuller's Earth; it is rich in vitamin B but poor in vitamin G. Fraction 11 F is a hot aqueous extract of fresh hog liver, concentrated and precipitated by addition of alcohol; it is rich in vitamin G and contains no vitamin B.

Table II—Effect of Autoclaved Yeast when Added to Basal Ration Containing Seeds or Their Products as Sources of Vitamins B and G

SOURCE OF VITAMINS B AND G	No. OF LITERS	No. OF YOUNG	No. OF YOUNG WEANED	AVERAGE WEANING WEIGHT	PER-CENTAGE MORTALITY
Oatmeal	60				
Yeast auto.	5	6	36	30	49.0
Oatmeal	60				
Yeast auto.	10	8	48	48	51.3
Yellow corn	60				
Yeast auto.	5	12	72	65	48.4
Yellow corn	60				
Yeast auto.	10	12	72	65	54.1
White corn	60				
Yeast auto.	5	12	72	66	55.2
White corn	60				
Yeast auto.	10	12	72	65	57.1
Barley	60				
Yeast auto.	5	12	72	64	44.7
Barley	60				
Yeast auto.	10	12	72	66	54.8
Wheat	30				
Yeast auto.	10	6	36	30	50.0
Rice polishings	10				
Yeast auto.	10	12	72	70	56.3
Wheat germ	10				
Yeast auto.	10	12	72	66	56.8
Rice bran	10				
Yeast auto.	10	12	72	72	54.1
Corn germ	10				
Yeast auto.	10	12	72	44	27.2

It is evident that addition of vitamin B did not have any significant effect, whereas the addition of vitamin G markedly lowered mortality and increased the weight of the young. The vitamin G preparation was as effective as 10 per cent of autoclaved yeast.

Table III—Effect of Addition of Preparations of Vitamins B and G to Basal Food Mixture Containing Yellow Corn or Wheat as the Sole Sources of B and G

SOURCE OF VITAMINS B AND G	No. OF LITERS	No. OF YOUNG	No. OF YOUNG WEANED	AVERAGE WEANING WEIGHT	PER-CENTAGE MORTALITY
Yellow corn	60	5	30	10	27.5
Yellow corn	60				
0.318 g. Fraction daily	8B	6	36	4	30.2
Yellow corn	60				
1.66 g. Fraction daily	11F	6	36	32	54.5
Wheat	60	6	36	16	27.5
Wheat	60				
0.318 g. Fraction daily	8B	6	36	22	29.8
Wheat	60				
1.66 g. Fraction daily	11F	6	36	36	53.8

SUMMARY

Oatmeal, yellow corn, white corn, barley, wheat, rice polishings, wheat germ, rice bran, and corn germ have been studied from a lactation standpoint as the sole sources of vitamins B and G.

LITERATURE CITED

1. EVANS, HERBERT M. AND BISHOP, K. SCOTT. On the Existence of a hitherto unrecognized dietary factor essential for reproduction. *Science*, 56:650-651. 1922.
2. McCOLLUM, E. V. AND SIMMONDS, N. A study of the dietary essential, water-soluble B, in relation to its solubility and stability towards reagents. *J. Biol. Chem.*, 33:55-89. 1918.

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