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PROJECT REPORT
COMMITTEE ON FOOD RESEARCH
QUARTERMASTER FOOD AND CONTAINER INSTITUTE
FOR THE ARMED FORCES
CHICAGO ILLINOIS

RESEARCH AND DEVELOPMENT BRANCH
MILITARY PLANNING DIVISION
OFFICE OF THE
QUARTERMASTER GENERAL

COOPERATING INSTITUTION: University of Wisconsin	LOCALITY: Madison, Wisconsin
DIVISION: College of Agriculture	DEPARTMENT: Department of Biochemistry
OFFICIAL INVESTIGATOR: C. A. Elvehjem. (11) 31 Oct 47, (10)	COLLABORATORS: Eugene M. Sporn
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(6) (Upper case) Nutritive Value of Army Rations. (9) Progress Rept. No. 5, 1 Sep-31 Oct 47,

SUMMARY

Studies have been conducted on monkeys fed K rations to determine the effect when individual supplements of eight of the ten crystalline B vitamins are administered. It has been noted that each of the following vitamins produced a weight response when fed to monkeys losing weight on the K rations: thiamine, riboflavin, pyridoxine, choline, folic acid and biotin. All but folic acid were inactive in eliciting this growth response unless pyridoxine was present as a supplement to the diet. Only folic acid and pyridoxine had an effect on the hemoglobin concentration, in addition to growth stimulation. From these results, it appears that K ration does not contain sufficient pyridoxine and folic acid for the growing monkey. In one case, the removal of all supplementary vitamins from a monkey on K ration caused death within two weeks.

Monkeys have been continued on the 10-in-1 ration plus vitamins, and various supplements are being fed to note their effect upon the growth of the animals. Preliminary results indicate a growth response with additional casein. This is being checked with other animals. Recently monkeys were started on preparations of the monkey antianemia factor to determine their effect. It is possible that a deficiency of this factor may be causing the low hemoglobin content of the blood noted even when vitamins and milk produce normal growth in monkeys fed 10-in-1 ration.

The E ration cannot support growth of monkeys when fed in the unsupplemented form. The addition of a mixture of the water-soluble vitamins improved the ration so that normal growth was obtained for a short period. In one case, the addition of 10% casein was sufficient to continue the normal growth rate. This work is being repeated with other animals.

Work has been continued on the effect of supplementation of K ration fed to rats. With K ration containing a double level of B vi[illegible] basal, individual amino acids were fed at 0.3% of the diet. The addition

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of phenylalanine had no effect upon growth; lysine had an inhibitory effect, the rats averaged 5 gms. a week less than the basal; methionine caused an increased growth of 4 gms. a week per rat above the basal group. When all three amino acids were added to the diet, again no effect upon growth was observed. The effects of lysine and methionine seem to counteract each other when fed simultaneously.

With the information gained from work with K ration, the C and 10-in-1 rations were fed in a similar manner. The following results were obtained:

	Ave. gain/week at end of 4th week (gm.)
(1) C ration alone	21
(2) " " plus vitamins A and D	21
(3) " " " " " " " plus B vitamins	24
(4) " " " " " " " " " " plus casein	33
(5) 10-in-1 ration alone	18
(6) " " plus vitamins A and D	18.5
(7) " " " " " " plus B vitamins	22
(8) 10-in-1 ration plus vitamins A and D plus B vitamins plus 5% casein	27

Normal growth of rats was obtained when C ration was supplemented with vitamins and casein. With the same supplements, 10-in-1 ration was improved so that rats grew at a fair but still at a suboptimum rate. Vitamins A and D had no effect upon the growth rate.

Experiments have been started with rats to note the effect of the coffee in the K ration. The animals are being fed the ration with and without coffee, and the results will be reported shortly. In addition, studies have been undertaken with young dogs. They are being fed the E and 10-in-1 ration to note their effect upon growth, hemoglobin and general appearance. It is felt that a comparison of monkey, rat and dog results will give us a clearer understanding of the nutritional adequacy of the rations.