COMPARISON OF THE BIO-AVAILABILITY OF COMBINATION VITAMIN AND MINERAL SUPPLEMENTS

BACKGROUND

Vitamins and minerals are required for animal and human health. One of the most critical periods for vitamin and mineral nutrition is from birth to adulthood during the time of rapid growth. A deficiency of vitamins and minerals can lead to a slowing of growth, ill health and ultimately, death.

In this study, two different vitamin and mineral combinations are compared in a rat growth assay. Equal amounts of the two combinations are given to weanling rats depleted of body vitamin and mineral stores. The growth of the rats is used as a measure of the relative availability of the supplements.

PROTOCOL

Sixteen weanling rats were divided into two groups of equal average weight. The * group weighed 47.3 ± 3.8 grams and the Foodform® group weighed 47.1 ± 4.0 grams. All animals were individually housed. Each group was depleted of body vitamins and mineral stores by feeding diet containing no vitamins and minerals (Bio-Serv, Inc.) for a period of two weeks. Then the rats were repleted by feeding the same diet to which has been added either 10 * Vitamin and Mineral tablets/kilogram of diet or 60 grams of Foodform® Vitamin and Mineral Mix/kilogram of diet. The two supplements contained equal quantities of vitamins and minerals and the composition is listed below.

Component	Amount/kg food	Recommended Amount/kg food			
Vitamin A	50,000 I.U.	4,000 I.U.			
Vitamin E	300 I.U.	300 I.U.			
Vitamin C	600 mg				
Folic Acid	4 mg	1 mg			
Thiamine	15 mg	4 mg			
Riboflavin	17 mg	3 mg			
Niacin	200 mg	20 mg			
В6	20 mg	6 mg			
B12	60 µg	50 μg			
D	4,000 I.U.	1,000 I.U.			
Pantothenic Acid	100 mg	8 mg			
Iron	180 mg	35 mg			
Calcium	1,000 mg	5,000 mg			

Phosphorous	1,000 mg	5,000 mg
Iodine	1,500 μ g	35 µg
Magnesium	1,000 mg	400 mg
Copper	20 mg	5 mg
Zinc	150 mg	12 mg

The recommended amount is taken from the "Nutrient Requirements for Laboratory Animals" published by the National Academy of Sciences in 1978. It is the amount recommended for optimum growth. As can be seen from the list, the diet provides more than the minimum amount of most vitamins and minerals. It, however, does not provide sufficient amount of calcium and phosphorous. It contains only the recommended amount of Vitamin E.

- * = A national brand multiple purchased retail and ground up. (name withheld)
- Foodform® = Above formulation duplicated with Foodform® Vitamins and Foodform® Yeast Minerals.

The two groups of animals were pair-fed to insure that the amount of food eaten by both groups was the same. This means that differences in weight between the two groups was not due to differences in the amounts of food consumed. The animals were weighed weekly during the study.

The results of the study are shown below.

AVERAGE WEIGHTS

GROUP	<u>0</u>	<u>1 Week</u>	2 Weeks	<u>3 Weeks</u>	<u>4 Weeks</u>	<u>5 Weeks</u>	<u>6 Weeks</u>
* Group	47.1	51.6	49.0	51.3	50.6	49.2	48.6
FOODFORM®	47.3	51.1	49.5	58.4	68.0	72.7	80.04

The average weight of the two groups before the study was the same. The first two weeks were the depletion period and in both groups after two weeks there was only a slight weight gain relative to time zero. At the time of two weeks, the two groups were supplemented with equal amounts of vitamin and minerals and the * Group began to record gains in weight indicative of repletion of body stores of vitamins and minerals. The * Group continued to maintain a constant weight indicating both stores of vitamins and minerals were not being repleted. At the end of three weeks, one of the * group died and a second rat died at the end of four weeks. A plot of the results is shown in the accompanying graph.

Another difference in the two groups was their appearance and general health. The eyes of the * group were almost closed by the end of five weeks. Their hair was fine and sparse. One of the * animals had

scratched one of his eyes out. The * Group was very sluggish in movements as compared to the Foodform® Group.

These results indicate that the vitamins and minerals in the Foodform® product are much more available to the growing rat than the vitamins and minerals in the * product.



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