

Comparison of the Absorption of Different forms of Magnesium

Background

Magnesium is involved in more chemical reactions in the body than any other mineral. The blood magnesium concentration is maintained in homeostasis by hormonal control and cannot be used to measure the absorption of magnesium in a supplement. Urine excretion has been found to parallel magnesium dietary intake and thus can be used to compare the absorption of different forms of magnesium.

Protocol

Eight healthy college age subjects participated in the study with informed consent. There were three females and five males. From a seven day dietary list, their average magnesium consumption was 248 ± 129 mg which is slightly lower than the RDA. Each subject appeared in the morning after an overnight fast for supplementation. A pre-dose 24 hour urine sample was collected before each supplement. Then 500 mg of magnesium in each of 4 forms, Magnesium Oxide (Oxide), Magnesium Glycinate (Glycinate), Amino acid Chelate (Chelate) and 5% Magnesium Yeast (Yeast) were given in 100 ml of orange juice. The subjects were then allowed to eat lunch and dinner and a 24 hour post-dose urine collected. The supplements were taken at weekly intervals in a random order. In addition, each subject took a placebo yeast (Placebo) which contained less than 0.1% Magnesium as a control. Later in the study, subjects were allowed to eat breakfast and then waited two hours before supplementation so that the digestive tract would be emptied. This was done because several of the magnesium supplements caused gastrointestinal irritation and diarrhoea. The results are given in the following table.

Net 24 hour Urine Excretion (Post Dose - Pre Dose), mg

Subject	Placebo	Yeast	Glycinate	Chelate	Oxide
1	44.5	308.6	83.6	176.0	119.7
2	----	120.6	116.3	-----	69.8
3	5.0	138.2	52.0	167.0	83.6
4	26.2	111.0	108.8	140.0	46.8
5	35.8	127.6	62.7	75.3	84.8
6	24.1	299.5	79.1	46.1	104.6
7	7.4	140.3	3.9	125.5	113.9
8	43.3	62.9	142.9	91.0	117.3
Average	26.6	169.6	81.2	117.3	92.6
± (S.D.)	15.9	95.5	43.1	48.3	25.9

Discussion

The placebo product has very little excretion of magnesium indicating that the magnesium yeast data represents excretion due to the magnesium in the yeast. The yeast produced significantly more magnesium in the urine than did the placebo ($p < 0.01$ by a paired student's t test). The yeast produced as 83% greater excretion of magnesium than did the Magnesium oxide ($p < 0.05$). The yeast produced a 109% greater excretion of magnesium than did the magnesium glycinate ($p < 0.05$). The yeast caused a 45% greater excretion of magnesium than did the chelate, but the difference was not significant ($p > 0.05$).

In conclusion, Magnesium yeast was significantly more absorbed than Magnesium Oxide, Magnesium Glycinate and Placebo yeast. The yeast was more absorbed than the Chelate.