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Project Number
S1602

Project Title
Human Health: Quantitative Comparative Analysis of Lactobacillus Colony Forming Units in Probiotic Supplements

Abstract

Objectives/Goals
The objective was to compare the number of colony forming units (CFU) in differently priced probiotic supplements. Measured CFU number and growth rate were compared to the advertised ones. The overall goal was to determine which probiotic is best for the person to consume, based on CFU, price, and growth rate.

Methods/Materials
The independent variable was the five different probiotic supplements, ranging in price (UP4, Nature Way, Target, Culturelle, and Albertsons). The dependent variable was the number of CFU that grew on MRS agar plates for each supplement. Clinically tested Culturelle Daily Probiotic Formula was used as a positive control. Five probiotic supplements were plated in a series of five logarithmic dilutions. The number of CFU was counted per plate. Each supplement was tested five times. The plates were dyed with a Gram Staining kit. All was done in a sterile indoor environment.

Results
The average number of detected CFU per one pill of supplement is as follows: UP4 - 10^5, Nature Way - 10^9, Target - 10^7, Culturelle - 10^9, and Albertsons - 10^2. All tested supplements contained Lactobacilli and Bifidobacterium, with no detectable contamination. Different probiotics grew at different rates - UP4 strains grew twice as fast as Albertsons.

Conclusions/Discussion
The data showed significant differences in probiotic concentration between different supplements. These differences cannot be explained by measurement error or variability between samples of a supplement. The range between individual samples is within two magnitudes; the range between different supplements is within seven magnitudes, significantly bigger than the measured variability.
Price has little correlation with the number of CFU in a supplement. Although the cheapest supplement had the fewest CFU, the most expensive supplement did not have the most CFU. Culturelle and Nature Way supplements demonstrated the best value (probiotic bacteria per dollar).
The growth rate showed the supplement's vitality. UP4 grew fastest, so its bacteria were most active. A consumer should seek to buy an active probiotic supplement.
Each tested supplement contained fewer CFU than advertised. The current labeling system of probiotic supplements does not provide sufficient information for a consumer. This data highlights the lack of clear labeling guidelines for probiotic supplements.

Summary Statement
Probiotic supplements, sold over the counter to promote human health, demonstrated remarkably different concentrations of Lactobacillus, despite similar advertisement labels.

Help Received
None. We designed, performed, and analyzed the experiments ourselves.