How Will the Population of Human Gut Microbe Lactobacillus fermentum Be Affected by Exposure to Macromolecules Glycerol, Zein, and Gliadin?

Mulhollen, Rylee (School: Sarasota High School)

In order to discover the relationship between beneficial gut bacteria and the ingestion of different macromolecules, Lactobacillus fermentum was exposed to the macromolecules gliadin (the defining protein in gluten), zein (a protein found in corn), and glycerol (a common fat). Through UV/Vis Spectrophotometer absorbance, the research showed that the gliadin was the only macromolecule to cause a negative effect and decrease in the population of Lactobacillus fermentum, whereas the glycerol and zein proved beneficial in aiding the given bacterium's population to grow more than that of the control which saw very minimal population increase of the Lactobacillus fermentum. Via statistical analysis of the data, it was determined that the results were statistically significant and supported the hypothesis that gliadin would function as a detriment to Lactobacillus fermentum while glycerol and zein would foster its growth through a population increase. This data provides a deeper understanding of the human gut microbiome in general and is especially useful in determining the environmental causes and viable treatment options for autoimmune disorders like Celiac disease and irritable bowel syndrome with this research hinting at the relationship between a beneficial microbe and different components of macromolecules of the average American's daily diet.