

The Effects of Gastric Mucous with Chemically Raised pHs on Lumen Model Mass Retention After Acid Exposure

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The lumen walls of the stomach protect themselves from gastric acid corrosion by coating themselves in gastric mucous. It was predicted that if gastric mucous had chemically raised pH levels (made to be more basic), it would better protect the lumen from corrosion and mass loss because it would neutralize excess acid (Bell, n.d.). Pieces of beef of uniform mass and surface area were coated in gastric mucous models with varying levels of basicity: pH 7, 9, 11, and 13, as well as a control group with no mucous. The pieces were soaked for 50 hours in a .01 M HCl solution to model the acidity and environment of the human stomach; afterwards, the masses were measured and the percentage of original mass retained was calculated. The pieces with no gastric mucous experienced the most corrosion, retaining only 59.4% of their original mass on average; the group that retained the most mass/experienced the least corrosion/had the most effective gastric mucous was the group with mucous of a pH of 13 (the most basic), having retained 84.8% of its original mass on average. The data collected supported the original hypothesis; the trend that emerged was that a more basic gastric mucous better protects the lumen walls from being corroded and losing mass. The data was carefully collected in a controlled environment, leading to a fair degree of confidence in the results; nevertheless, the results can't exactly correlate to the human stomach as the experiment was conducted in vitro, or on dead tissue. Regardless, the concept of chemically enhanced gastric mucous is one worth serious thought and exploration; it would allow the excruciating lumen corrosion experienced by Zollinger-Ellison syndrome patients to be cured without complicated surgeries or chemotherapy.