

The Effect of Artificial Sweeteners on *Lactobacillus acidophilus* and Its Potential Impact on the Female Endocrine System

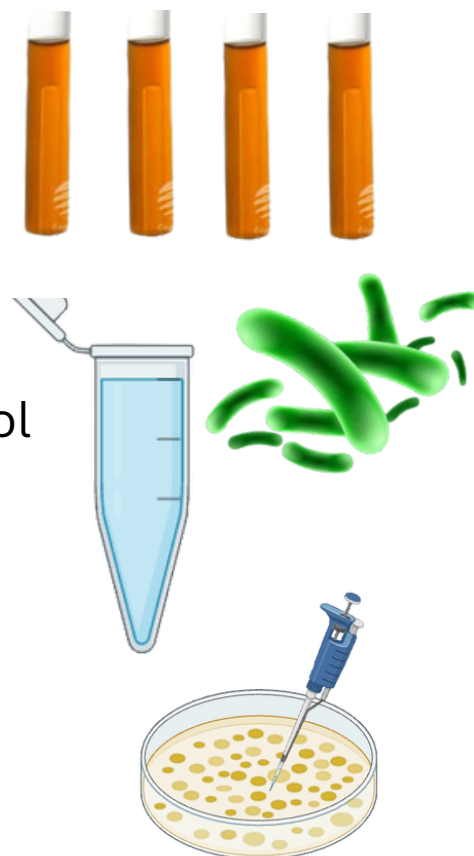
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Research Question

- RQ: How does the **consumption of artificial sweeteners** affect the growth of *Lactobacillus acidophilus*, and what are the potential implications for female endocrine and reproductive health?
- Problem: Artificial sweeteners are widely consumed but may disrupt gut bacteria critical for reproductive health
- Purpose: Investigate how artificial sweeteners affect *Lactobacillus acidophilus* growth **to understand potential reproductive and hormonal impacts**
- Hypothesis: Increasing concentrations of aspartame and sucralose will inhibit/slow *Lactobacillus acidophilus* growth compared to a control

Methodology

- Controlled in vitro lab experiment using *Lactobacillus acidophilus*
- Sweetener solutions of Aspartame & Sucralose were prepared at **0, 20, 40, 100 mg/mL concentrations**
- Mixed bacterial culture with sweetener solutions; control received distilled water
- Plated bacteria on MRS agar, incubated at 37°C for 24 hours
- **Measured growth using fractal dimension analysis (Db) to quantify colony patterns**
- Replicated each condition to ensure reliability

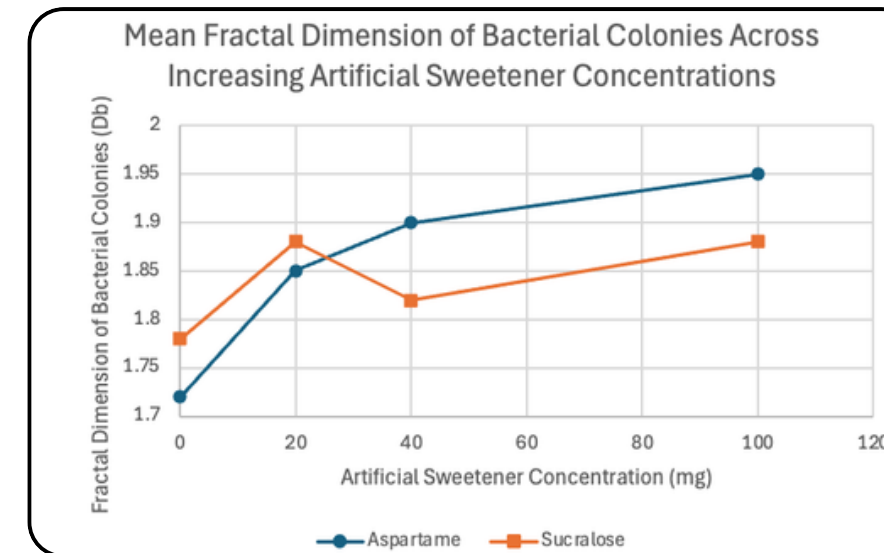


Data Analysis & Results

Analysis: Two-factor ANOVA on Db values for sweetener type and concentration

Results:

- Sweetener concentration had a significant effect on bacterial growth (**p = 0.0079**)
- Higher concentrations → more irregular/dispersed colony patterns (increased Db)
- Sweetener type (aspartame vs. sucralose) not significant (p = 0.635)
- No significant interaction between type and concentration (p = 0.279)



Interpretation & Conclusions

- Higher sweetener **concentrations disrupt *Lactobacillus* growth**, indicating potential gut dysbiosis
- A disrupted gut microbiome **may affect the gut vaginal axis, hormonal balance, and fertility**
- Findings align with the literature connecting *Lactobacillus* abundance to reproductive health
- Suggests **moderate consumption of sweetener may reduce** microbiome disruption
- Future work: Test other sweeteners, long-term exposure, in vivo studies, and microbiome/hormonal tracking