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## The Growth of the Probiotic *Lactobacillus fermentum* in Varying pH Concentrations and Sodium Oxalate

Kidney stone disease affects around 1 in 10 people in North America. Kidney stone disease can be defined as the build up of solid material or minerals throughout the kidneys, urinary tract, and other associated organs. The build up of material can cause blockages and kidney failure if left untreated. One of the main mineral components that makes up kidney stones is oxalate. Oxalate is bound to a salt such as sodium, potassium, calcium. Oxalate is found in a variety of foods, including French fries, baked potatoes, spinach, and rhubarb. Oxalate buildup leads to kidney stone disease and can cause kidney failure and cancer in severe cases. Healthy bacteria known as probiotics can provide health benefits and has been a focus in kidney stone treatment. Consumption of probiotic rich food is often encouraged for patients at risk of developing kidney stones. Probiotics are a small part of a multi-factor equation when it comes to treatment.

In this research study, the probiotic *Lactobacillus fermentum* is a gram positive bacteria and a facultative anaerobe. We were able to establish growth in various pH conditions (pH 6.5, 6, 5.5, 5) which reflect the different pH environments found within the human gastrointestinal tract. We also tested the growth of *L. fermentum* in varying concentrations of sodium oxalate solution (concentrations of 100 mM, 50 mM, 25 mM, 12.5 mM). Growth rates were tracked over an 8 or 10 hour period and OD readings were recorded. Results suggest that pH did not have a significant impact on the growth of *L. fermentum*. Higher concentrations (100mM) of the sodium oxalate solutions appeared to have a greater impact on the growth of *L. fermentum*.

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