The Effects of Sugar Alcohols on S. epidermidis and M. luteus

Cheng, Josiah (School: Queensland Academy for Science, Mathematics and Technology)

Carbohydrates and alcohols can have promotive and inhibitive effects on bacterial growth, respectively. However, there exists an intermediate, sugar alcohols, which can have varying bacterial effects. This essay investigates "What is the effect of different sugar alcohols, (glycerol, erythritol, xylitol, sorbitol and maltitol), and glucose, on the growth of Staphylococcus epidermidis and Micrococcus luteus, as indirectly measured and compared by solution turbidity, in vitro?". 5% w/v sugar alcohol, or glucose, nutrient broth solutions (NBS) were prepared. Preliminary trials were performed using S. epidermidis and M. luteus 1:10 and 1:20 ratios, bacteria to NB-only, where interval turbidity readings were measured up to 1890 minutes. It was determined that 1:20 ratios at 1000 minutes produce high bacterial growth rates, hence the bacteria were incubated at these parameters with different sugar alcohol NBS at 30°C. It was concluded that glycerol, xylitol, sorbitol and maltitol all have minor inhibitive or negligible growth impacts on both bacteria. Glucose increased growth by 21% and 71%, respectively for S. epidermidis and M. luteus. Erythritol decreased growth for both bacteria by approximately 42%. Furthermore, results indicated that all investigated substances had comparatively reduced effects on S. epidermidis. Sugar alcohols share several similar properties with carbohydrates, including sweetness. As determined by this investigation, they also have minor to inhibitive effects on some bacteria, unlike carbohydrates, as bacteria may gain net energy losses when metabolising sugar alcohols. Hence, implications of these findings may involve sweetening food and oral health products with sugar alcohols, to reduce detrimental oral bacterial growth.

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