

# New low and no calorie sweetener study finds positive or no impact on gut microbiota

ex vivo



## The Purpose:

To understand the impact of low and no calorie sweeteners (LNCS) on the human gut microbiota, as it plays a critical role in health.

Diet is one factor that can affect the human gut microbiota. It is important to continue to explore if LNCS are fermented by the gut microbiota and subsequently affect microbiota and the substances they produce.<sup>1</sup>

To note, a person's health status can affect the composition of their gut microbiota.<sup>2,3,4</sup> Persons with type II diabetes tend to have lower amounts of bacteria capable of producing butyrate which provides energy to colonic cells and other health benefits. Thus, the study was also conducted with persons with type II diabetes.

## The Study:<sup>5</sup>

fecal samples from **12** participants



**6** adults with Type II Diabetes  
**6** healthy co-living adults



**7** study arms

NSC

TA

SO

MA

ST

SU

ACK



No substrate control

Rare sugar

Sugar alcohols

High intensity sweeteners

- **Tagatose (TA): 5 grams/day**
- **Sorbitol (SO): 5 grams/day**
- **Maltitol (MA): 5 grams/day**
- **Sucralose (SU): 1.05 grams/day**

- **Acesulfame K (ACK): 1.05 grams/day**
- **Stevia: 280 mg steviol equivalents/day**

Doses of LNCS were based on recommended usage levels, estimated daily intake, acceptable daily intake and gastrointestinal tolerances.



Test conditions

**84**

tested over time



SIFR<sup>®</sup> testing points

SIFR<sup>®</sup>(Systemic Intestinal Fermentation Research), "ciphe", is a validated model used to recreate the gut environment outside of the human body in order to study how what we eat and drink affect our gut microbiota.<sup>6</sup>

## Results:

Substances we eat and drink are fermented (or broken down) by bacteria in the colon. Fermentation produces compounds that may provide health benefits.<sup>7</sup> One example is short chain fatty acids (SCFAs), acetate, propionate and butyrate, which may positively affect immune function, mineral absorption, and provide energy to intestinal cells.

How easily a substance is fermented (or broken down) is measured by fermentation speed, the production of by-products and changes in the diversity of the gut microbiota.<sup>7</sup>



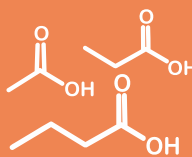
### Speed of fermentation by gut microbiota:

- Tagatose and sorbitol were easily and rapidly broken down within the first 6 hours.
- Maltitol and stevia were broken down gradually over 6 to 24 hours.
- Sucralose and Acesulfame K were not broken down in 48 hours.



### Tagatose, sorbitol, maltitol and stevia consumption:

- Increased bacterial density of microbiota to varying degrees.
- Increased bacterial density of specific SCFAs at different rates.
- Differences were observed between subjects with type II diabetes and healthy adults for tagatose, sorbitol and maltitol.

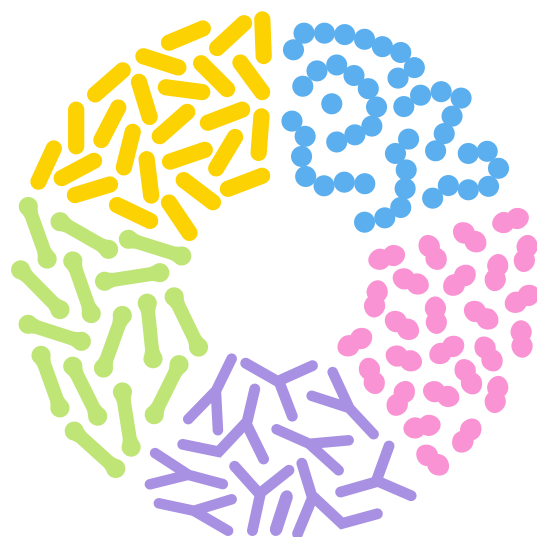


### Sucralose and acesulfame K consumption:

- Had no effect on SCFA production.

## The Conclusion:

This study demonstrates that LNCS's impact on the gut cannot be generalized. Each LNCS tested affected the gut microbiome in a highly specific manner ranging from no effects (sucralose and acesulfame K) to intermediate effects (stevia) to strong effects (tagatose, sorbitol and maltitol). The sweeteners used in this study are representative of what can be found in products on the shelf. Each group of sweeteners has their own metabolic fate.



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