

## Sucralose:

Blenkley, E., Suckling, J., Morse, S. et al. (2023) Environmental life cycle assessment of production of the non-nutritive sweetener sucralose (E955) derived from cane sugar produced in the United States of America: The SWEET project. *The International Journal of Life Cycle Assessment*. DOI: 10.1007/s11367-023-02228-z

**Article link:** <https://rdcu.be/dncK4>

**What is this study important:** What we eat is a key factor in not only our health and well-being, but also our environmental footprint. From the health side, excessive consumption of added sugar is increasingly linked to various non-communicable diseases. Non-nutritive sweeteners are one option for allowing people to still enjoy sweet foods, and reduce their added sugar intake. But while the health effects are highly scrutinised, to date there has been very little research on the environmental impacts of making the swap. Research into the environmental impact of sweeteners is needed.

**Aims:** For this study we conducted an environmental life cycle assessment to understand the impacts of producing the sweetener, sucralose. It is made by modifying sugar molecules in such a way that makes it taste 600-times sweeter. In this study, the sugar came from sugarcane grown in the USA. The aim was to calculate the environmental impact of making 1 kg sucralose, and then to go one step further and compare it to the equivalent sweetness of sugar. This is important because sucralose never replaces sugar on a like for like weight basis. Instead, because it is about 600-times sweeter, about 1.3 g sucralose replaces 1 kg sugar.

**What did we do:** We studied the manufacturing process of sucralose to build a model which allowed us to calculate its resource demands. The study took in patents and other literature sources to identify the materials used in turning sugar into sucralose, and further calculate energy demands and estimate emissions. Our manufacturing model was then added to existing environmental impact studies for making sugar, to create the entire process from the sugarcane field to the final purified sucralose. The calculated environmental impact results let us compare 1.3 g sucralose to 1 kg sugar. The study was conducted in line with the ISO 14040 and 14044 standards for life cycle assessment studies.

**What did we find:** The results showed that sucralose has a lower environmental impact than the same sweetness of sugar. The results were the same across nearly all impact categories. For example, sucralose has about 15% the global warming potential of sugar, 0.8% for land use, or 2% water consumption. This shows that not only does sucralose production cause less greenhouse gas emissions than the equivalent amount of sugar, but it also has the potential to spare other precious resources, such as water or land area.

**What does this mean:** Currently, about 85% of all sweeteners consumed by people are in drinks. This research shows that replacing sugar in drinks with sucralose has the potential to markedly reduce the environmental impact of those drinks.