

## Stevia:

Suckling, J., Morse, S., Murphy, R. et al. (2023) Environmental life cycle assessment of production of the high intensity sweetener steviol glycosides from *Stevia rebaudiana* leaf grown in Europe: The SWEET project. *The International Journal of Life Cycle Assessment*. DOI: 10.1007/s11367-022-02127-9

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**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, whilst reducing 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, stevia rebaudioside A (aka Reb A) from stevia grown in Greece and processed in France. The aim was to calculate the environmental impact of making 1 kg Reb A, and then to go one step further and compare it to the equivalent sweetness of sugar. This is important because Reb A never replaces sugar on a like for like weight basis. Instead, because it is about 250-times sweeter, about 4 g Reb A replaces 1 kg sugar.

**What did we do:** We collaborated with the cooperative who grow the stevia in Greece, and the company in France that extract and purify it, to quantify the resources required to produce 1 kg of Reb A from their stevia leaves. The resources include inputs such as fertilisers used in the field, energy, or materials used during extraction. They also include wastes produced, or emissions which might occur. We collected data across the production life cycle, from propagating seeds into seedlings, maturing the plants in the field, harvesting, and drying the leaves, shipping them from Greece to France, and finally, extracting and purifying the Reb A. The calculated environmental impact results let us compare 4 g Reb A 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 Reb A has a lower environmental impact than the same sweetness of sugar. The results were the same across all impact categories. For example, Reb A has about 10% the global warming potential of sugar, 7% for land use, or 7% water consumption. This shows that not only does Reb A 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 Reb A has the potential to markedly reduce the environmental impact of those drinks.