

# R&D TRENDS: SWEETENERS AND THEIR IMPACT ON HUMAN HEALTH



## Overview

In recent years, low calorific value and good palatability have led to an increasing use of sweeteners. However, correlations between sweeteners and various health conditions indicate the need to better understand and communicate their potential risks and appropriate use.

**Background:** Sweeteners, or sugar substitutes, are used across many industries and represent a significant global market. However, overuse may be detrimental to human health.

**Market potential:** It is estimated that the food sweetener market size will be more than \$80 billion in 2024 and continue to grow in the coming years. Patents dominate sweetener-related scientific publications, indicating high commercial interest in this field.

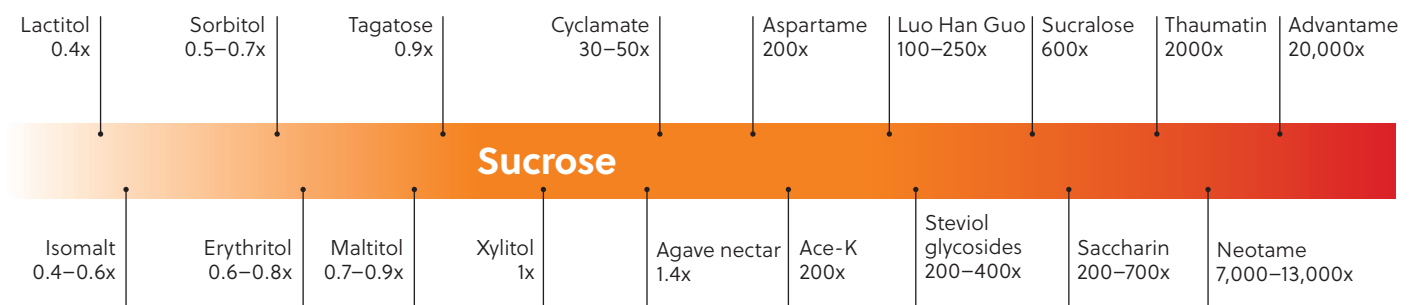
**Key benefits:** Non-nutritive sweeteners add sweetness without providing the same caloric content as table sugar (sucrose), making them suitable alternatives for consumers aiming for weight loss or individuals with metabolic syndromes.

**Key challenges:** Recent reports indicate potential links between sweeteners and health conditions, such as cancer, heart disease, and kidney disease, that the public may not understand.

## Types of sweeteners

Sweetness varies between different sweeteners, impacting the amount needed to generate a similar taste to table sugar (sucrose). A positive patent-to-journal publication ratio for thaumatin, sugar alcohols like xylitol, maltitol, erythritol, sorbitol, and other sweeteners such as stevia, insulin, and maltodextrin suggests strong commercial interest in these sweeteners.

## Estimated sweetness intensity of various sweeteners as compared to table sugar (sucrose) based on weight bases

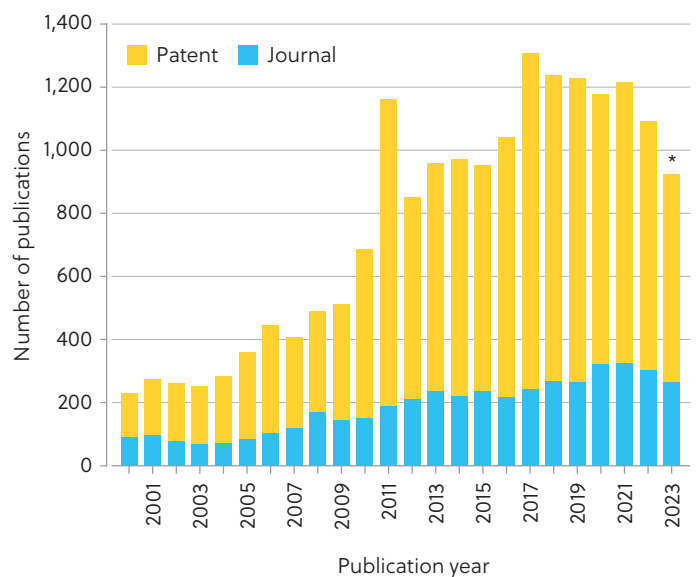


Data sourced from the FDA website [www.fda.com](http://www.fda.com) and cited journal publications.

## Publication trends

The number of scientific publications related to sweeteners rose steadily from 2000 to 2017, followed by a slight decline. Patent publications dominate the field, indicating high commercial interest. Fifty percent of patents originated in China, and many others came from the U.S. and India.

## Number of journal and patent publications published per year in the field of sweeteners



\*Jan–Oct 2023 only.

## Health implications

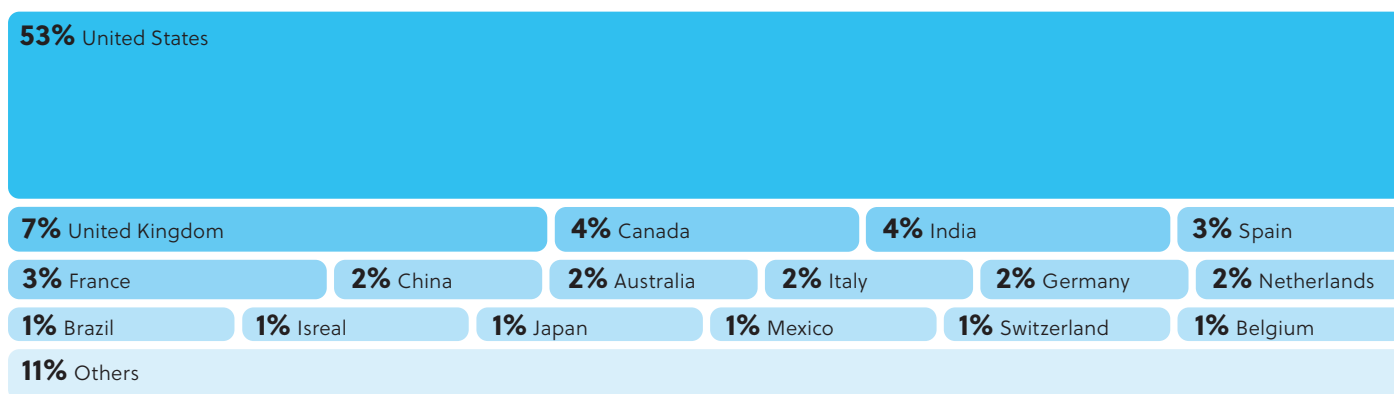
Consumption of sweeteners within acceptable limits can help restrict carbohydrate intake in obese or overweight populations and manage conditions such as diabetes. Stevia, a natural plant-based sweetener, also has antioxidant, anti-inflammatory, and anti-microbial properties.

However, sweeteners may be subject to overuse or misuse by consumers unaware of the potential long-term health implications. A 10–12-year follow-up study found that non-nutritive sweeteners used in beverages led to an increase in coronary heart diseases and kidney disorders. At the same time, reports have linked aspartame, saccharin, Ace-K, and cyclamate with possible carcinogenicity. Furthermore, recent studies have shown that artificial sweeteners can spike insulin levels similarly to sucrose and, therefore, may not be beneficial in diabetic patients.

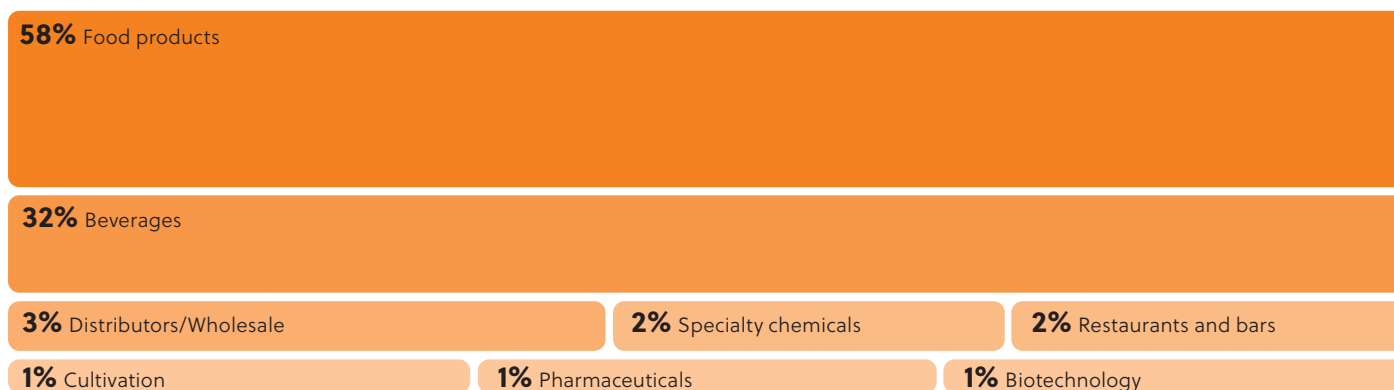
## Capital investment

Invested capital and deal count for sweeteners have steadily increased over the last 20 years, which is indicative of high commercial interest. Over 50% of capital was contributed by the U.S., and ~90% was attributed to the food and beverage industry.

### Geographical distribution of capital invested in the field of sweeteners from 2002–2023



### Leading industries in terms of capital invested from 2002–2023



Data from PitchBook.

## Looking ahead

Sweeteners are widely used across various industries and are a staple component of many 'diet' or 'low-calorie' foods and drinks. However, recent reports of carcinogenicity and links with other health conditions highlight the need for large-scale and long-term consumption studies, as well as improved awareness of the potential risks among consumers.

Learn more at [cas.org/insights](https://cas.org/insights)