



Sugar

» **DID YOU KNOW** that sugar remains one of the first foods to respond to a rise in personal incomes?¹ And, with **rising populations** and **increasing affluence**, especially in emerging economies, sugar consumption is here to stay. But what is the binding ingredient in this recipe? Why, advanced processing technology of course!

SWEET HISTORY ACROSS THE SALTY SEAS

The people of New Guinea were most likely the first to domesticate sugar cane around **8000 B.C.**²

In the **16th century**, a teaspoon of sugar cost the equivalent of five dollars in London.²

In **327 B.C.**, Alexander the Great discovered the sugarcane – it then spread through Persia and was introduced in the Mediterranean.³

Christopher Columbus introduced sugar to the New World in **1493**.³

WORLD SUGAR PRODUCTION IS FORECASTED TO REACH **207.7 MILLION METRIC TONS** IN 2021/2022⁴

Around **68%** of the sugar market exists in mainly developing countries, while Europe accounts for only **20%** and North America, the remaining share.⁵

India **15.5%**
European Union **10.0%**
China **8.4%**
Brazil **2.7%**
US **4.6%**⁶



India **15.4%**
European Union **11.3%**
China **9.3%**
Brazil **7.5%**
US **6.4%**⁶



Europe, China and India, are the three **largest consumers** of sugar worldwide.⁵

Developing countries will continue to experience the **strongest growth** in sugar consumption, fueled by rising incomes and populations.⁵

APPLICATIONS IN ACTION

Sugar (sucrose) has many unique functional properties, which makes it an important ingredient in many foods for both consumers and industrial customers.⁵



Baked goods



Confectionery/candy



Frozen desserts



Beverages



Tabletop sugar



Canned/bottled foods

All food and beverages containing sweeteners can fit in an eating lifestyle that meets both nutritional and energy needs when consumed in moderation with appropriate portion size and combined with regular physical activity.⁵

Recent technical advances have added to the range of sweeteners available for food use and expanded the applications of these sweeteners in diet and health-oriented foods.⁵

DECOLORIZATION

A key step in the production of white sugar from sugarcane

WHY DECOLOR CANE SUGAR?

Decolorization technologies have been developed to maximize white sugar production yield by **20 – 30%**, which helps increase revenue for those in the harvesting, processing, production and consumer chain.



There are **3** basic types of refined or semi-refined sugar:⁵

1. White or refined sugar is the purest product and the one usually found on tables in kitchens and restaurants.
2. Brown sugar is less refined and still has many impurities, primarily from the 3.5% – 6.5% molasses remaining. The more molasses, the darker the product and the stronger the flavor.
3. Liquid sugar (sucrose and invert sugar) is sucrose split into its base components of fructose and glucose. This is typically sold to commercial food processors only.



Flavor Enhancement



Texturizing & Bulking



Mouth Feel



Humectancy & Preservation



Fermentation



Color & Browning

THE CANE SUGAR REFINING PROCESS

Sugar mills are located in cane growing areas. Cut cane is processed to dark raw sugar crystals for export to refineries. Typically located near global population centers, these refineries further process the raw sugar to produce white sugar. A key goal of refining is to separate white sugar from color.



SUGAR MILLS



AFFINATION



EVAPORATION



DECOLORIZATION



DRYING/PACKAGING

AFFINATION: Raw sugar crystals are centrifuged with hot sugar syrup to remove the outermost layer from the crystals, which contains much of the color.

REMELTING: The crystals are dissolved with hot syrup to produce a dilute thin syrup.

PURIFICATION: Precipitation and filtration processes remove solids, some color, and other contaminants.

EVAPORATION: Multi-step evaporation produces hot colored concentrated syrup called thick juice.

DECOLORIZATION: The thick juice is processed through ion exchange resins to lower its color, enough to produce white sugar.

CRYSTALLIZATION: Final evaporation of this syrup and the addition of seeding crystals enables crystallization of white sugar.

DRYING/PACKAGING: Hot dry air is passed through the sugar crystals to prevent future hardening or caking.

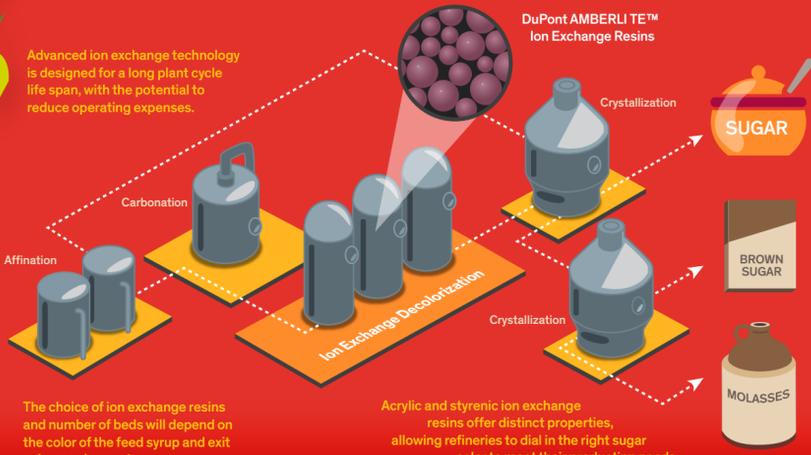
DID YOU KNOW?

When harvested, plant colors mix with cane sugar, which make the raw material brown.

The refining process decolors sugar to become white, although ALL sugar is slightly brown in reality.

HOW DOES DECOLORIZATION WORK?

Advanced ion exchange technology is designed for a long plant cycle life span, with the potential to reduce operating expenses.



The choice of ion exchange resins and number of beds will depend on the color of the feed syrup and exit color requirements.

Acrylic and styrene ion exchange resins offer distinct properties, allowing refineries to dial in the right sugar color to meet their production needs.

Advanced ion exchange resin technology is an excellent choice for cane sugar decolorization, offering system flexibility and low cost to operate. Key benefits include maximum yield and high-quality sugar production for food & beverage manufacturers, along with increased shelf life of the sugar and processed foods.

¹ Source: FOD018D - Global Markets for Sugars and Sweeteners in Processed Foods and Beverages, Copyright © BCC Research, Wellesley MA USA, Website: www.bccresearch.com

² Source: Macinnis, Peter. 2002. Bittersweet: The Story of Sugar. Crows Nest, Australia: McPherson's Printing Group

³ Source: https://www.dominosugar.com/family-fun/sugar-facts

⁴ Source: U.S. Department of Agriculture

⁵ Source: FOD018D - Global Markets for Sugars and Sweeteners in Processed Foods and Beverages

⁶ Source: BCC Research, USDA-FAS

