

INTERNATIONAL TECHNICAL CARAMEL ASSOCIATION

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International Technical Caramel Association (ITCA)

How Is “Caramel Color” Made?

“Caramel Color” is one of the oldest and most widely used food colorings for enhancing naturally occurring colors, correcting natural variations in color, and protecting colors that could be lost to light degradation during food processing and storage. The use of Caramel Color as a food additive in the brewing industry in the 19th century is the first recorded instance of it being manufactured and used on an industrial scale. Today, Caramel Color is found in many commercially produced foods and beverages.

Often, consumers ask whether Caramel Color is the same as caramel. The term “caramel” is often used to describe confections and flavors made from caramelized sugar. The term “Caramel Color” only describes the color additive, but its name comes from the caramelization process involved in manufacturing it.

The caramelization reaction is the browning of sugar during the cooking process. Simply heating sugar without any other reactants, such as when heating sugar on a stove top, results in a deep brown syrupy solution, typically known as “caramel.” To make Caramel Color, one can choose from sucrose or other types of sugar, such as dextrose, invert sugar, lactose, malt syrup, or starch hydrolysates or fractions thereof. The process to generate Caramel Color is a combination of caramelization and the more complicated Maillard reaction, which typically involves amino acids (a nitrogen source) and a baking, roasting, or searing type of cooking.

There are four classes of Caramel Colors. Each class uses different raw materials added to the carbohydrate base to generate the color bodies when heated. Industrial Caramel Colors are rated by their color strength, and they also have different chemical properties. Class I Caramel Colors, or plain caramels, which use an acid or base to help generate the color, are useful in alcohols, seasoning sauces (especially in the Asian market), and baking applications; they typically have the lightest color shades. Class II Caramel Colors, or sulfite caramels, which use a sulfite salt as a reactant as well as high temperatures and pressures to develop their color, are commonly used in spirits and have midrange colors. Class III Caramel Colors, which use ammonia compounds to generate color, are used in beers and have midrange colors. Class IV Caramel Colors, which use both sulfite and ammonia compounds, contain the richest color of all the Caramel Colors and are used in carbonated soft drinks (CSD). These are simply a few examples where Caramel Color ingredients may be useful.

Caramel Colors are manufactured by two different technologies -- a non-pressurized system or one that adds pressure. The atmospheric, or non-pressurized, system only applies heat up to around 340 °F (somewhat less than what you need to cook a turkey) and, along with the reactants listed above, generates the color bodies formed during the caramelization reaction. These Caramel Colors tend to have higher viscosities and thickness and are made in small batches. Pressure-style reactors use both heat and pressure to create lower viscosity, water-like Caramel Colors in larger batches. A finished liquid Caramel Color can then be dried to form a powdered Caramel Color that can be used in dry applications.

Caramel Colors have an almost infinite range of uses. They are often used to color colas, spirits, cereals, sauces, spices, and even pet foods. They also impart different hues to the application, from bright yellow to reddish hues, all the way to gunpowder black. Caramel Colors help consumers enjoy a predictable appearance in their packaged foods and beverages, which allows for a consistent visual experience while consuming their favorite products.