

INTERNATIONAL TECHNICAL CARAMEL ASSOCIATION

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International Technical Caramel Association (ITCA) Frequently Asked Questions on Caramel Color

1. What is caramel color?

Caramel color is a color additive that helps foods, beverages, pharmaceutical¹ products, and cosmetics (among others) maintain their distinctive appearance.²

The U.S. Food and Drug Administration (FDA) regulations describe caramel color as a dark-brown liquid or solid created through controlled heat treatment of food-grade carbohydrates such as sucrose, dextrose, and starch hydrolysates. Certain food-grade acids, alkalis, and salts may be used to further refine caramel color to best suit the intended use.³

2. Are there different types of caramel color?

Yes, caramel color can be derived from a variety of food-grade carbohydrates, including dextrose, malt syrup, molasses, and starch hydrolysates, among others. The carbohydrate is processed to produce one of four types of caramel color: Class I, Class II, Class III, or Class IV. Now, what does this mean? Each class consists of a variety of different caramel ingredients with their own unique properties that make them suitable for differing applications.

Class I caramel colors, also known as plain caramel, have a strong aftertaste and mild aroma. Ingredients within this class can range in color from yellow to red. Class I caramel colors are stable in alcohol, tannin, and salt-rich environments, making them ideal food additives for whiskies, liqueurs, lemonade products, poultry coatings, juice concentrates, sauces, and cocoa extenders.

Class II caramel colors offer an exceptional red tone, as well as a mild flavor profile and aroma. Similar to Class I caramel colors, Class II caramel colors exhibit good stability in alcohol, so they are often found in wine, liqueurs, and brandy. Class II caramel colors can also be found in light cake mixes and other snack foods.

¹ 21 C.F.R. § 73.1085.

² 21 C.F.R. § 73.2085.

³ 21 C.F.R. § 73.85. Regulations on the use of caramel color differ slightly around the world, depending on the region's relevant public health agency. The information provided in this document focuses on the use of caramel color in the U.S. Other organizations engaged with caramel color regulation include the World Health Organization (WHO), the Codex Alimentarius Commission, the European Food Safety Authority (EFSA), Health Canada, and the Japan Ministry of Health, Labor and Welfare.

Caramel colors within Class III have a red-brown coloring and a sweet aroma. They are used in a wide variety of applications, including cereal, beer, pet food, licorice, gravy, and soy and barbeque sauce due to their stability in alcohol and salt-rich environments.

The most commonly used, and most versatile, of the caramel colors is Class IV. Caramel colors within this class have a rich dark brown color, and very mild aroma and flavor profile. Their stability in alcohol, tannin, and acid-rich environments make Class IV caramel colors ideal ingredients for the widest variety of applications. These include balsamic vinegar, coffee, chocolate syrups, soft drinks and other carbonated beverages, baked goods, cocoa extenders, pet foods, sauces, soups, meat rubs, seasoning blends, and other flavorings.

3. What is the advantage to using caramel color?

Part of the appeal of food lies in its appearance, which is why chefs around the world are mindful of both the color and flavor palette of the foods they create.

The same applies to packaged food and beverages. A predictable visual experience is a key factor for many consumers, given a strong association between the color and enjoyment of food. Caramel color helps to ensure consistency in the appearance of food and beverage products. As a result, food and beverage producers use color additives to minimize variations between batches, which arise due to natural variations and also degradation from processing and storage conditions. The use of caramel color helps to result in a more consistent food or beverage color for consumers. Caramel color can be used to enhance the yellow, red, brown, and black hues of a variety of foods or beverages, depending on the type and concentration added.

4. Can caramel color be called a natural color additive?

Given the complexity involved in determining the appropriate uses of the term “natural” on food labels, no uniform legal definition has been established for this term across the U.S. There is no “natural” certification for caramel color. For additional information, please visit the [FDA](#) and the [U.S. Department of Agriculture’s \(USDA\) Food Safety and Inspection Service \(FSIS\)](#) websites. Neither of these agencies have established a natural certification for caramel colors.

5. What regulatory classifications of color additives exist?

Under U.S. law, all color additives must have FDA approval before they are used in foods, drugs, or cosmetics. The parameters of these approvals are published in FDA’s regulations.

In addition, some color additives are permitted to be used only if they are from batches that FDA itself has certified to meet requirements for composition and purity. Like many other

colors derived from natural sources, however, caramel color is exempt from batch-by-batch certification by FDA. Regulations further define specifications for color manufacturers.

6. How do I know if there is caramel color present in my food/beverage?

In the U.S., “caramel color” is a common term on product ingredient lists. Caramel color and other colors alternatively may be listed as “color added.”

7. Are caramel colors safe to consume?

The safety of caramel colors has been established through decades of extensive investigation and use. Certain chemical compounds that may form in caramel colors and other cooked/roasted foods have been associated with carcinogenic activity in laboratory animals, but only when those specific compounds were directly administered to the animals at very high levels; the amounts of such byproducts present in caramel colors do not pose any risk to consumers. Caramel colors themselves have never been associated with carcinogenic activity.

Food safety authorities around the world continue to recognize caramel color as safe and authorize its use as a color additive in a broad range of food and beverage products. Both the use of caramel color and the ingredients used in its production are regulated globally.

Manufacturers may select the permitted ingredients and processing conditions to produce one of the four types of caramel color (*i.e.*, Class I, II, III, and IV) to ensure the end product is suitable for a particular food and/or beverage application. Regardless of the type of caramel color produced, the product must be well-characterized and meet strict specifications to ensure compliance with applicable regulations.

More information on the safety of caramel colors is available on the ITCA [Safety](#) and [Resources](#) web pages.

8. How is caramel color produced?

Under FDA regulations, caramel color is created using a number of food-grade carbohydrates, including dextrose, invert sugar (*i.e.*, a mixture of glucose and fructose), lactose, malt syrup, molasses, starch hydrolysates, and sucrose. The desired carbohydrate is heated under controlled temperature and pressure conditions that allow for caramelization to occur. During caramelization, a wide range of compounds form in the mixture, which gives caramel color its distinct flavors and aromas. Additional food-grade acids, alkalis, and salts may be added to assist the caramelization process and to ensure the production of a specific type of caramel color.

9. Can I make caramel color when cooking at home?

Yes, simple caramel color can be prepared at home simply by heating brown sugar and water until the mixture is reduced to a slightly syrupy consistency. The goal is to boil the sugar water until it develops a dark brown color, but to avoid burning the sugar.

10. Is caramel color listed by the State of California under Proposition 65 (Prop 65)?

Caramel color is *not* a chemical on the State of California's Prop 65 list.

The California Safe Drinking Water and Toxic Enforcement Act of 1986, also known as Prop 65, requires entities doing business in California to provide particular warnings to consumers about significant exposures to chemicals that have been identified by the state to cause cancer, birth defects, or other reproductive harm.⁴ The Prop 65 list includes a very large number of chemical compounds, and is updated at least annually. Caramel color manufacturers and users must comply with any obligations applicable to their products.

11. What is 4-methylimidazole (4-MEI)? Are there risks associated with its consumption?⁵

4-MEI is a chemical compound that is not directly added to food, but can form as a byproduct in some foods during the normal cooking process. FDA has stated, for example, that 4-MEI may form when coffee beans are roasted, or when meats are roasted or grilled. It also may be formed as a trace impurity during the manufacture of Class III and Class IV caramel colors that are used as ingredients in certain beverages and foods. According to FDA, based on the available information, there is no reason to believe that there is immediate or short-term danger presented by 4-MEI consumption at the levels expected in food from caramel color use.

⁴ See Office of Environmental Health Hazard Assessment, *About Proposition 65*, available at <https://oehha.ca.gov/proposition-65/about-proposition-65>.

⁵ FDA, *Questions & Answers on Caramel Coloring and 4-MEI*, available at <https://www.fda.gov/food/ingredientpackaginglabeling/foodadditivesingredients/ucm364184.htm>.