

Technical Tips

Naturally Derived Coloring in Spirits and Liqueurs

Color enhances visual appeal. There is no second chance to make a first impression with beverage consumers.

Caramel Color and Burnt Sugar

Caramel color, the world's most consumed food coloring, is widely-used in alcoholic beverages to standardize batch-to-batch variation, influence hue, and help protect flavor from light. For centuries it has played a key role in distillers' ingredient portfolios for differentiation.



Global regulatory authorities recognize four classes of caramel color. Spirits and liqueurs contain Class I, II, or IV for stability with tannins. Beer and malt drinks contain Class III for stability with protein. Malt-based, apple-flavored cider in some regions contains Class III, while traditional cider contains Class IV. Mixing Class III, which carries a positive colloidal charge, with a negatively charged spirit caramel (Class I, II, IV) or beverage will result in an irreversible haze or precipitation. Class I or IV may serve as substitutes for Class II as these three are negatively charged.

We recommend adding caramel color as close to bottling proof as possible since it may precipitate upon exceeding its given solubility in alcohol. However, this reaction is reversible because the caramel will go back into solution once the beverage's alcohol percentage is decreased (by dilution).

The 'clean label' trend in recent years has helped to increase the market for Class I caramel color and burnt sugar. In North America, "caramel color" may appear on package labels regardless of class, while in Europe E-numbers specify class for labeling. In November 2009 The European Technical Caramel Association (www.euteca.org), chaired by D.D. Williamson's Barry Foley, agreed on 'decision tree' based standards of labeling for the food industry, as follows:

Burnt Sugar or Plain Caramel Color in Europe?

Food Manufacturer's Purpose or Function	Classification of Ingredient or Additive	Labeling in the European Union
Primary: Flavor Incidental: Color	Burnt Sugar	"Burnt Sugar"
Primary: Color Incidental: Flavor	Class One Caramel Color	Either "Colour Plain Caramel" or "E150a"

The regulation EC 110/2008 defines "Burned Sugar" (instead of "Burnt Sugar") as an ingredient option for spirits. For this particular application, "Burned Sugar" is the product obtained exclusively from the controlled heating of **sucrose** -- without bases, mineral acids or other chemical additives. In the DDW product table on the reverse side, those purely sucrose-based products show an asterisk*.

Whisky

While single-barrel whisky rarely contains caramel color, Class I or IV is common in varieties of Irish, Canadian and others -- especially blends. The historical, strict definition of Scotch whisky specifically states that Class I ("Plain" in EU) caramel color may be added. The molecular weight profile of caramel color bodies can assist in identifying non-standard whisky and function in 'fingerprinting.'

Rum

Dark, spiced, and aged rum varieties contain Class I for its high-proof alcohol stability. The table on the reverse side demonstrates how Class I tolerates a higher proof level than Class II or IV.

Tequila

In Mexico both Class I and IV are used in 100% agave under the Reposado and Añejo classifications. Caramel color is very common in tequila less than 100% agave to ensure the golden color of Joven.

Brandy

While some grape brandy is aged in wooden barrels, the majority contains Class IV to match the effect of such aging. Cognac from France and sherry from Spain have traditionally contained Class II. Brandy from fruit other than grape -- such as apple, apricot, cherry, and pear -- frequently contains caramel color. Other beverages containing caramel color include fortified (or dessert) wine such as sweet vermouth.

Liqueurs/Cordials

Caramel color -- ubiquitous in cocoa, coffee and amaretto liqueurs -- is frequent in citrus, berry, or herbal-based bitters and liqueurs. For improved stability in cream drinks, it is helpful to premix caramel color with alcohol before adding cream ingredients.

Flavored Malt Beverages / Wine Coolers

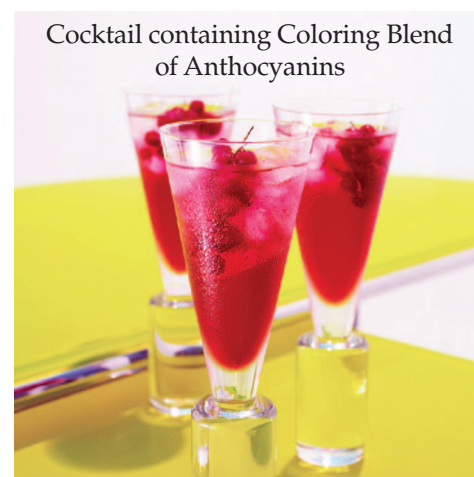
Malt-based flavored beverages would require Class III. Wine coolers may contain Class IV.

Selecting the Right Caramel Color or Burnt Sugar

Note in the table below how within one class of caramel color, there is an inverse relationship between color intensity (darkness) and hue (yellow/redness).

DDW Product	Description	Color Intensity ABS @ 610nm	Hue Index (typical)	Stability in Alcohol (ABV)
050	Class IV, double-strength	.243	4.2	50%
055	Class IV, double-strength	.257	4.2	50%
105	Class IV, single-strength	.109	4.5	50%
108	Class IV, single-strength	.065	5.8	60%
112	Class IV, single-strength	.115	4.5	60%
136	Class IV, single-strength	.090	5.4	75%
190	Class II	.040	6.7	50%
520 *	Class I, acid proof	.058	6.5	60%
525 *	Class I	.033	7.0	75%
528 *	Class I	.014	7.5	75%
570	Class I	.044	7.0	80%
720 *	Burnt Sugar, acid-proof	.058	6.5	60%
757 *	Burnt Sugar	.057	6.5	60%
785	Burnt Sugar	.048	6.5	75%
790	Burnt Sugar	.001	5.6	80%
810	Natural Flavoring: Caramelized Apple	.019	6.8	60%
820	Certified Organic Caramel Color, acid-proof	.058	6.5	60%
830	Natural Flavoring; Caramelized Sugar	.050	6.0	35%

* Sucrose-based.



Other Naturally Derived Coloring

Alcoholic beverage companies have recently initiated the use of naturally derived coloring in new products. DDW offers several solutions, including blends, that can replace artificial (certified = synthetic) color additives. Naturally derived coloring may differ from artificials in terms of stability, dosage, and cost; nonetheless some developers may make the clean label decision.

Carmines may replace Allura Red (FD&C Red 40) for a close hue match, or purple sweet potato may work if the pH is below 3.5. At lower concentrations where the synthetic red has an orange-red hue, elderberry may substitute. The amount of light allowed through the finished beverage package highly impacts the stability of a naturally derived color choice. For example, DDW's turmeric (curcumin) nicely replaces the hue of Tartrazine (FD&C Yellow 5), but it has poor light stability. Turmeric can work where the beverage is protected from light such as can, full shrink-wrap label, or UV coating. In a package that allows light to reach the beverage, beta-carotene or lutein is an excellent yellow choice.

DDW offers a full line of naturally derived colorings and blends, and samples are available upon request. The portfolio includes anthocyanins, carotenoids, curcumin, betalains, carmine/cochineal, chlorophyll, and of course, caramel color.



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