

Technical Tips

Caramel in Brewing

A valuable brewing ingredient for more than a century, caramel contributes to the character of beer on every continent. Caramel provides color, flavor, and consistency in beer. It also has applications in a variety of related products including cider, shandy, and non-alcoholic malted beverages. Caramel, by weight, is the world's most widely-consumed coloring ingredient in foods and beverages.

What is Caramel?

Caramel is produced from the controlled heat treatment of carbohydrates, typically glucose syrup. The glucose can be combined with food grade catalysts to facilitate the browning process and provide caramel color stability. A standard beer caramel is a long polymer chain that is a positive-charged colloidal solution, which lends to its beer stability due to the positive charge of the beer (malt protein charge). Caramel, an inert, physically stable product when stored properly, will not promote bacterial growth.

Beer caramels are available in a range of color intensities as well as a variety of different hues (from pale yellow, to red, to brown).

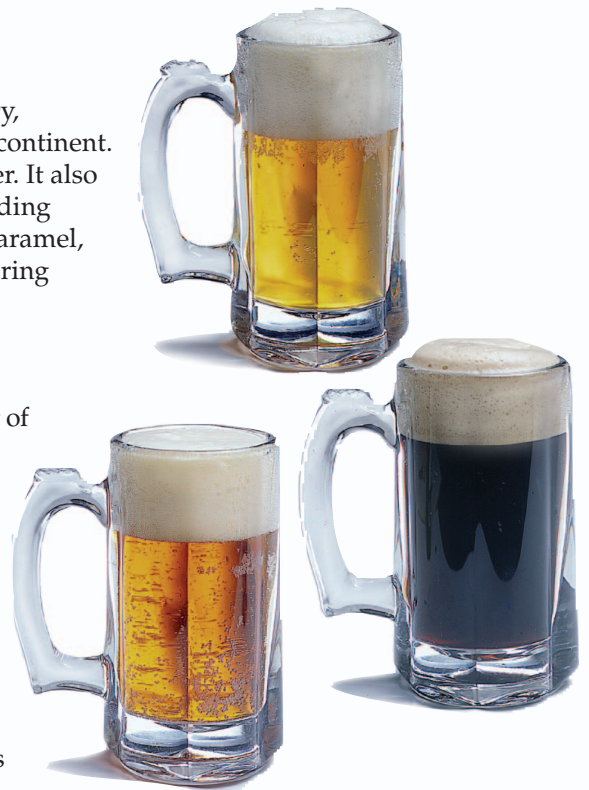
Brewery Applications

Each brewery may have its own particular caramel application method; in general, brewers add caramel either at the wort boiling stage (if large volumes are required) or at the end to standardize color lost in batch processing. Brewers can make adjustments to final beer color by adding caramel to the beer during the filtration process. The caramel can be added to ensure finished product color consistency or to target a darker color without significantly adding to the beer's calories or gravity.

The dosage of beer caramel varies by type. Traditional ales contain 0.02% or more to add color and some flavor character. Certain dark beers, including some stouts and bocks, may rely on higher caramel dosage. Lagers require more minimal caramel amounts for color consistency (typically 0.01%) than other types. Adjusting a lager type beer to a Bock beer color would require an addition of 0.05-0.075%.

Brewing Advantages

Advantages of using caramel – apart from its stability as a beer color – include its ease of addition in metered volumes, its cost effectiveness compared to other coloring choices, and its unique flavor. Caramel can be utilized to adjust the final beer color (or adding to the visual appeal) without changing the character of the beer.



International Standards

The World Health Organization (WHO) and United Nations (UN) Joint Evaluation Committee for Food Additives (JECFA)¹, the European Union and United States recognize four classes of caramel color. Furthermore, the U.S. Food and Drug Administration (FDA) identifies caramel color as GRAS (Generally Recognized as Safe)². These authorities specify caramel's purity standards³, and D.D. Williamson's caramels meet these standards.

All beer caramels are in Class III; however, not all Class III caramels are stable in beer. Hence, D.D. Williamson performs a test on each batch of its beer caramels (300-series) to ensure its stability in beer. Class III caramels that are not beer-stable result in beverage turbidity.

¹JECFA Compendium of Foods Additive Specifications, 2006.

²United States Code of Federal Regulations (CFR), Title 21, Section 172.1235.

³Food Chemicals Codex, Eighth Edition.

Beer Caramel Specifications

The table below outlines D.D. Williamson's best-selling beer caramels. The company also manufactures ten speciality beer caramels not included in this product list.

DDW Product	Color Intensity ¹ (Typical)	Color I.O.B. ² (Typical)	Color EBC's ³ (Typical)	Hue Index ⁴ (Typical)	Percent Solids	Feature
#300	.085	24,500	22,000	5.6	74%	popular in North America
#301	.108	31,500	29,800	5.5	66%	most widely-used beer caramel globally
#303	.130	35,000	34,000	5.5	65%	available globally
#304	.075	20,500	19,000	5.6	74%	for malta or pilsner
#305	.075	20,500	19,000	5.6	74%	slight sweet and spicy accent
#306	.075	20,500	19,000	5.6	74%	a sweet porterine flavor
#310	.060	17,000	16,000	5.7	74%	Emkamalt; yellow tone

Test Methodology

¹ Color Intensity = Darkness = Absorbance of a 0.1% (w/v) solution of caramel in deionized water measured in a 1-cm cell at 610 nm wavelength

² Color I.O.B. = Institute of Brewing = Absorbance of 0.1% (w/v) solution at 530 nm x 100,000

³ Color EBC's = European Brewing Convention units = Absorbance at 430 nm x dilution x 25

⁴ Hue Index = Redness = $\text{Log}((\text{ABS @ 510 nm})/(\text{ABS @ 610 nm})) \times 10$

⁵ Fermentability % = DP1% + DP2% + DP3%



*For samples or technical questions,
please e-mail us at info@ddwmsn.com*

+1 502 895 2438 • caramel.com •  @ddwcolor

Manufacturing in USA • United Kingdom • Ireland • China • Swaziland • Brazil

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Gusmer Enterprises, Inc.[®]

North American Distributor
Gusmer Enterprises

West Coast Tel: 866.213.1131 Fax: 559.485.4254
East Coast Tel: 908.301.1811 Fax: 908.301.1812

sales@gusmerenterprises.com
www.gusmerenterprises.com