

Technical Tips

Caramel Color in Cooked Meat & Poultry

"We tend to perceive the attributes of a food item in the following order:

1) Appearance; 2) Odor / Aroma / Fragrance; 3) Consistency and Texture; 4) Flavor." *

*M. Meilgaard, G.V. Civille and B.T. Carr, Sensory Evaluation Techniques, 3rd Edition, CRC Press, 1999.

Since appearance is the top selection criteria, food coloring serves as a key ingredient category. For decades, product developers have formulated with caramel color -- the most widely used food coloring -- into gravies, sauces, marinades, rubs, and seasoning blends to enrich the experience of eating meat and poultry. In recent years, three trends have increased the use of caramel color *directly* in cooked meat and poultry.

- Less preparation time in cooking; need to "heat and eat"
- Use of microwave ovens in industry and at home
- Demand for pre-marinated, pre-cooked, or small portion, value-added products

Applications

Caramel color can improve the appearance of roast beef. Slow cooking retains moisture but often lacks the roasted "look" of high-temperature cooking. Caramel color can brown or blacken the exterior surface of **roast beef**.

Meatloaf (e.g., beef loaf, ham loaf, etc.), **cooked meatballs**, and other restructured meats often contain caramel color to overcome grayness. Naturally-occurring nitrates in onions, celery and bell peppers cause meat, though sufficiently cooked (interior 72+ degrees C.), to have a pink color. Consumers may mistake this appearance for under-cooking. Caramel color overcomes the pinkness effect. A safe internal temperature does *not* guarantee that the meat will have resulting visual appeal.



"Heat and Serve"
Sausage Patties

Consumers expect cooked **sausage patties** to have a dark, non-gray surface. **Pork** processors apply caramel color to sausage patties, for example, to improve "fried" appearance.

Labeling in the U.S.A.

Caramel color is a naturally derived coloring. When it is added to a product, the ingredient statement must include "caramel color", "caramel coloring", or "artificial color". In addition, the product name must be modified to indicate the presence of artificial coloring (e.g., "Cooked Roast Beef – Caramel Color Added" or "Artificially Colored") unless coloring:

- (1) a component within a product, e.g., breading, sauce, and sausage
- (2) chorizos, sausages of the longaniza variety, gravies, sauces, and similar products where the use of caramel is expected
- (3) only a component in a product, e.g., roast beef in a roast beef dinner

In general, meat and poultry processors can add caramel color either before or after cooking so long as the final product is cooked. For raw products, e.g., beef patties, caramel color may be used on the surface if the name is appropriately qualified on the label. Caramel Color is not permitted in raw product other than surface application because of concerns about the proper handling and cooking of the product.

For more information, see the U.S.D.A. Food Standards and Labeling Policy Book (August 2005) or Policy Memo 112.



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More

German **black forest ham** depends upon burnt sugar or caramel color to achieve its recognizable visual identity. **Sausage** and **hot dog** casings sometimes contain caramel color. Because cellulose casings must be soaked prior to use, processors include liquid or powdered caramel color in the ingredient bath.



Sausage Links

How to Apply Caramel Color

The flexibility of liquid and powdered caramel color allows for its introduction in a variety of ways on the production line. These include the following:

- Atomizing
- Spraying
- Tumbling or vacuum tumbling
- Drenching
- Dipping
- Casing
- Netting
- Packaging

Casings

A caramel-colored casing for any meat or poultry application offers the following advantages:

- Reduces the need for dipping and spraying
- Provides uniform color during thermal processing
- Shows visual appeal to the customer

Poultry processors tend to select the lightest caramel colors (e.g., DDW # 520, # 525, # 528 or # 570) for yellow to golden tones. Applications include **grilled chicken**, **rotisserie chicken**, **oven-roasted turkey** or **honey-roasted turkey**.

Case-ready deli poultry and **meats** increasingly contain caramel color as a product differentiator to consumers. **Roast beef**, **pastrami**, and **salad-ready chicken strips** are examples.



Roasted Chicken

Selecting the Appropriate Caramel Color

Caramel color is commonly defined as the controlled heat treatment of carbohydrates with or without the use of food-grade acids, alkalines or salts. Caramel color is heat stable in most food applications, but it darkens in the high temperatures of meat and poultry cooking.

International food standards recognize four classes of caramel color. Meat and poultry processors use three – Class I, III, and IV – in both liquid and powdered forms. Caramel colors in solution offer a wide range – from pale yellow to reddish-brown tan tones to dark brown to nearly black. Class I caramels provide the most golden tones for roasted chicken and turkey. Within each class there exists a measured, inverse relationship between color intensity (darkness) and hue (redness).

Smoke flavor and caramel color are complementary ingredients in cooked products. Liquid smoke can improve the color binding to meat proteins. The type of smoke flavor will determine the choice of a negatively charged or positively charged caramel color. The colloidal charge of caramel color is predictable according to class. Caramel color is very water-soluble. It tends to follow where the water goes in meat and poultry.

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