

## **If milk is white, why is butter yellow? Is food coloring added?**

We often think of milk as pure white, but full-fat milk can sometimes be faint yellow. Milk is essentially an emulsion of water, protein, sugars, and fat. Butter is made when the cream (fat) is separated from the milk and then agitated. Small fat particles collide with one another, consolidate, and then fall out of solution, leaving butter and watery whey behind. The color of the milk – and consequently the color of the butter that is separated from it – depends largely upon the breed of the cow and their diet. Natural butter can range from creamy white to pale yellow to saffron yellow.

Color differences in milk and butter are primarily due to the breed of cattle producing the milk. Some breeds produce white butter; others, yellow. The most popular breed of dairy cow in the United States, the Holstein, produces white butter. Traditional Holsteins are the black and white cows common on dairies throughout the North Country. Similarly, the Ayrshire produces white butter while the Milking Shorthorn produces a cream-colored butter. Breeds that produce yellow butter include the Brown Swiss, Jersey, and Guernsey. Guernseys, which are fawn and white in coat color, and Jerseys, which are small in stature and light to dark brown in coat color, are particularly well-known for producing milk with high levels of butterfat. The term “Golden Guernsey” was coined because of the high level of beta-carotene in that breed’s milk, which has a noticeable yellow or golden hue.

A cow’s diet is another factor that significantly affects the color of butter. Fresh grass is rich in beta-carotene, the nutrient that gives carrots their orange hue. Importantly, beta-carotene is precursor to Vitamin A, an essential human nutrient. When cows graze on fresh grass and other plants in a pasture during the summer, their milk is more likely to be darker yellow in color due to increased levels of beta-carotene. Dairy cows not on pasture are typically provided what is known as a total mixed ration (TMR). TMR usually consists of a mixture of corn silage, haylage, minerals, and other nutritious ingredients combined at a precise ratio. The haylage or silage in the TMR often has less beta-carotene than fresh grass, resulting in whiter milk and butter.

Consumers have historically favored yellow butter. For this reason, creameries producing white butter have traditionally added a brilliant yellow extract from the annatto seed (a tropical tree) to butter. This practice is less common today.

As we are “moo-ve” into the holiday season, consider adding locally made butters to your holiday table. Simple mashed potatoes aren’t complete without a dollop of high-quality butter on top. My personal favorite is honey cinnamon butter slathered onto warm dinner rolls. If you like a little kick, try butter mixed with Sriracha or chipotle powder.

One of our staff members, Erin O’Rourke, shared a fun family tradition that you might try this Thanksgiving. Pass a jar of cream around your Thanksgiving table. Each family member shakes the jar as they share what they are most thankful for. Once the jar has made its way around the table, the butter will have come together. It can then be separated from the whey and served with the meal.

Photo caption: This “Golden Guernsey” is named Halo and belongs to the Jantzi family.

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