

Technical Tips

Plant-based Hue Alternatives to Cochineal and Carmine

Cochineal extract and carmine, sourced from insects primarily grown on South American cactus, have a long history (centuries) of safe consumer usage as coloring in food and beverages. These natural colorings demonstrate excellent heat and light stability. In recent years, product developers have often selected cochineal extract or carmine when replacing synthetic (artificial) colors in formulations.

Despite the safety, some consumers and companies request alternatives (Table 1) for the following reasons:

- Cochineal is an insect
- Cochineal is neither kosher nor vegan
- Cochineal, though not one of the eight common allergens, is potentially a food allergen.

In January 2011, the U.S. Food and Drug Administration (FDA) will require food companies to label “cochineal color” or “carmine color” instead of “color added” for products containing these colorings.

Table 1. Hue Alternatives to Cochineal¹ and Carmine²

| Hue Alternatives | Product | Application | Hue Alternatives | Suggested usage rates (%) |
|------------------|-----------------------------|-----------------------------------|------------------------------------|---------------------------|
| Purple Red | Cochineal WS 20 AP (481000) | Acidic beverages or confectionery | Purple sweet potato WS 42 (466000) | 0.01 to 0.05 |
| Orange | Cochineal WS 80 AP (481001) | Acidic beverages | Custom paprika or blends | 0.01 to 0.05 |
| | | Confectionery | Paprika P 25 (443104) | |
| Red Pink | Carmine WS 45 (481002) | Confectionery, dairy, frosting | Red beet or custom blends | 0.025 to 0.05 |
| Red | Carmine OSS 120 (481004) | Cream based, yogurt | Custom blends | 0.01 to 0.05 |

¹ Carminic acid, the water-soluble extract of cochineal, is commonly labeled as cochineal extract.

² Carminic acid complexed with calcium or other metals produces carmine.



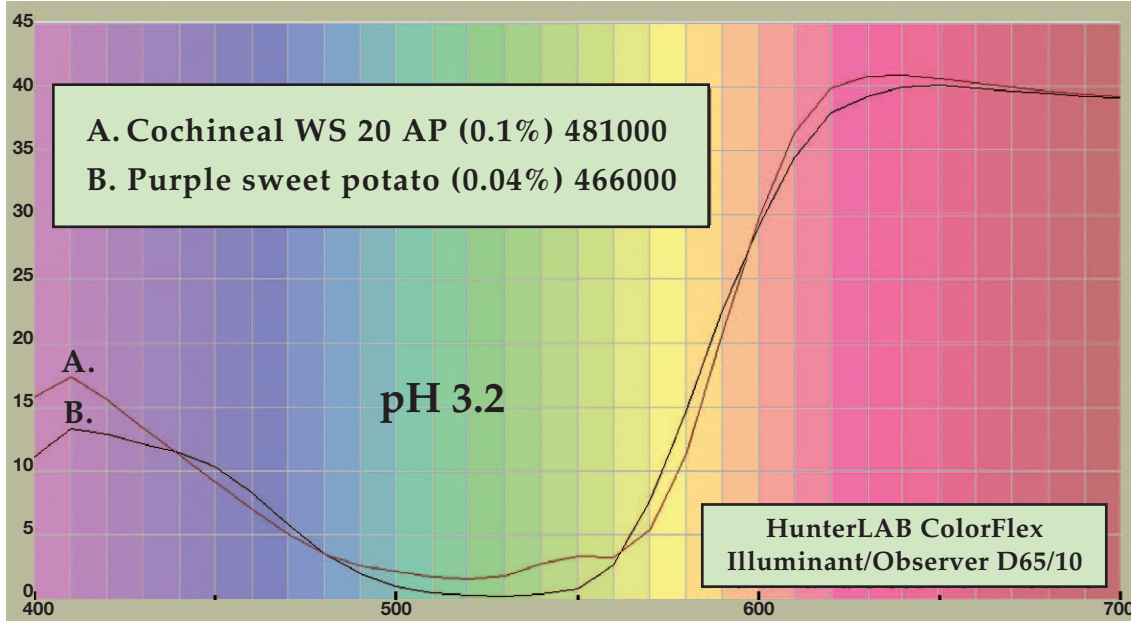
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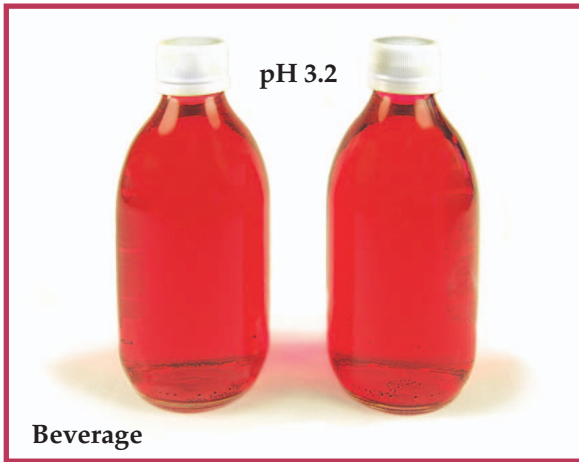
It remains very challenging to match the excellent heat and light stability of cochineal-based coloring with other naturally derived coloring. Hues are easier substitution targets. For example, the hue of water soluble cochineal is similar to anthocyanins from purple sweet potato (Fig. 1). Anthocyanins from black (purple) carrot may also apply, but the hue is more orange red than purple sweet potato coloring.

Figure 1.



In acidic beverages, purple sweet potato is close in hue to cochineal. Since purple sweet potato is derived from anthocyanins, its hue will become more purple as pH increases.

Substituting for Cochineal and Carmine in Applications



Left: 0.1% Cochineal in solution
 Right: 0.04% Purple Sweet Potato (466000) in solution



Left: Retail yogurt containing Carmine
 Right: Yogurt using colorMaker™ custom blend



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