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Demystifying Flavor Bases

You just received word that the flavor base used in your signature ice cream is no longer available, and you know of no other source for this magical elixir. ANXIETY ATTACK! Don't panic – you can get through this.

Flavor bases are widely used by the ice cream/frozen dessert industry. They offer a number of benefits, including:

- *Convenience* – they provide multiple ingredients/components in a single package.
- *Ease-of-Use* – because larger quantities are used in a batch, such as cups or quarts, measuring the correct amount is relatively simple.
- *Extended Ingredient Availability* – allows production of flavors, such as black raspberry, year-round, rather than only when the fruit is in season.
- *Recipe Support* – many suppliers provide starting-point recipes that incorporate their flavor bases.
- *Widespread Availability through Distributors.*

However, as Bob Dylan emphasized, “the times they are a changin’”, and flavor bases may not always be the right solution going forward. Reasons an ice cream/frozen dessert producer might need, or want to find alternatives include:

- *Lack of Availability* – a supplier may discontinue making a flavor base, may raise its minimum-order-quantity to an unworkable level, or may go out of business.
- *Presence of Minor Allergens* – the FD&C artificial colors that are in some flavor bases, particularly Yellow #5 and Red #40, have gained increased consumer scrutiny and concern because they can act as allergens and can stimulate hyperactivity in some children.
- *Clean Label Concerns* – because most existing flavor bases were developed before “clean label” ingredients were a consumer focus, flavor bases often include a number of “dirty label” ingredients, such as artificial FD&C colors, artificial flavors, artificial preservatives (such as sodium benzoate and potassium sorbate), high-fructose corn syrup (HFCS), polysorbate 80, mono- and di-glycerides, and artificial gums, such as cellulose gum. “Clean label” is of particular importance for packaged frozen desserts.
- *Flavor Quality* – while the flavor profiles of some flavor bases were considered to be good when the flavor bases were developed, their flavor profiles may taste artificial when compared with other flavor options available today.

- *Desire to Customize/Individualize Recipes* – decoupling the bundled ingredients in flavor bases can provide more developmental freedom versus one-size-fits-all flavor bases.
- *Cost* – in some instances, significant cost savings can be realized when flavor bases are replaced with individual ingredients.

Because flavor bases typically contain many ingredients, it can seem to be a daunting task to undertake reformulation to eliminate them. Reformulation can be simplified, however, by identifying and categorizing the key components in most flavor bases. I assign flavor base ingredients to one of four categories:

1. *Flavors* – because ice cream/frozen dessert inclusions don't, by themselves, typically provide enough flavor to satisfy consumers' taste/flavor expectations, most flavor bases include an added flavor. Except for citrus and mint flavors which are usually labeled as natural, most flavors used in flavor bases are labeled as either artificial or natural & artificial.
2. *Colors* – most colors used in flavor bases are artificial FD&C colors.
3. *Inclusions* – these can include anything from the walnuts in a maple walnut flavor base to the black raspberry puree in a black raspberry flavor base.
4. *"Stuff"* – while the above three categories are ingredients that are functional in your finished ice cream/frozen dessert, flavor bases also contain a number of ingredients that are not necessarily functional in your finished product. These can include artificial preservatives that prevent bacterial growth in the flavor base, sweetener systems, which often include high-fructose corn syrup (HFCS), used to regulate the Brix of the flavor base, and stabilizers and gums that may be required to make/keep the flavor base homogeneous.

When working to replace a flavor base, I have found that my preferred approach is to focus on replacing the flavor, color and inclusions, while in most instances, ignoring the "stuff" which provides little positive benefit to the quality of the finished frozen dessert. In taking this approach, you will often find that a much lower amount of the non-inclusion portion of the base is required versus what is provided in a flavor base.

In my experience, the reduced amount of non-inclusion additives used when replacing a flavor base does not negatively impact the quality of the finished ice cream/frozen dessert. For example, if your ice cream mix makes a great vanilla ice cream with just vanilla extract added, it should also make a great ice cream with small quantities of other flavors and colors combined with the appropriate inclusions. In fact, since water and sweeteners are the major portion of the flavor base that are typically eliminated using this methodology, you may even find that the quality of your finished ice cream has improved since there is less dilution of the dairy flavor notes and the fat level.

Case Study

My first experience with replacing a flavor base was in June of 2010 when a client approached us in a panic. Their supplier had discontinued an Orange Sherbet base which they had been using for years, leaving them in a lurch during peak production season.

Our first step was to review the ingredient declaration of the flavor base they had been purchasing. From this, we gleaned that the flavor used in the base was a natural flavor, that the orange color was provided by FD&C Yellow #6, and that the inclusion was orange juice concentrate.

As a next step, we worked to determine the required inclusion level. While for most frozen desserts the inclusion level is left to the manufacturer's discretion, for sherbets, the FDA has a Standard of Identity that dictates a minimum amount of inclusion that must be added. For citrus sherbets, two percent of the sherbet must be derived from the named citrus fruit; for berry sherbets, six percent of the sherbet must be derived from the named berry; and, for all other sherbets, 10% of the sherbet must be derived from the named fruit or flavor source. Armed with this information, we calculated the amount of orange juice concentrate required, and then built in a margin of safety.

Knowing that our client's preference was to move to cleaner labels when possible, we next evaluated Annatto Extract in a prototype formula as a possible replacement for the FD&C Yellow #6 in their existing formula. We were able to successfully identify a level of Annatto Extract which provided a color profile that was almost a perfect match for the FD&C Yellow #6.

We then evaluated several of our natural orange flavors in a prototype formula and identified one which was almost an exact match. During this phase of the project we also ended up tweaking the citric acid level in the formula to ensure we had a sweet/tart balance that was similar to that of the Orange Sherbet they had been making.

As a last step, we made one-quart prototype samples of their existing and our developmental formulas. Our client approved our developmental formula, then scaled it up successfully in their 100-gallon production batch. They have been using the revised recipe since.

To summarize, instead of our client purchasing a flavor base, they now purchase a Natural Orange Flavor and Annatto Extract from us, and purchase pails of orange juice concentrate from a local distributor. The development project not only resulted in an Orange Sherbet that was equal to or better than what they had been producing using the flavor base; it also resulted in lower raw material costs.

Additionally, since a significant portion of their product is sold packaged, they gained a clean-label advantage by having a shorter ingredient declaration which eliminated artificial FD&C color and artificial preservatives from the declaration. Their original label declaration read:

Orange Sherbet: water, sugar, corn syrup solids, cream, orange sherbet concentrate (orange juice concentrate, natural flavor, corn syrup, pectin, yellow #6 [color], citric acid, sodium benzoate, potassium sorbate & ascorbic acid [preservatives], calcium chloride), nonfat dry milk, whey protein concentrate, pectin, guar gum, citric acid.

Their new/revised label declaration reads:

Orange Sherbet: water, sugar, corn syrup solids, cream, nonfat dry milk, natural flavor, whey protein concentrate, citric acid, orange juice concentrate, pectin, guar gum, annatto extract (color).

Summary

Flavor bases have delivered significant benefits to ice cream/frozen dessert manufacturers for many years. If flavor base availability, changing market dynamics, or other factors require or induce you to investigate alternatives, you need not panic - viable options are within your reach.