



# Flavor Bites: Creating Great Flavors in Tough Times

Cost-effective ideas for flavor formulation

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With the financial crisis biting deep into every sector of our economy, creation of economical flavors has become extremely challenging. In a totally logical world, flavors—the key driver of repeat purchases—would be “no expense spared” food ingredients. Unfortunately, we live in a world in which buyers are always trying to save money wherever they can, particularly in the area of flavor costs.

Formulation of cheap flavors generally focuses on the use of cheap ingredients. Although that makes good business sense, it usually results in a flavor profile that could have been developed in the first half of the last century, as most cheap flavor ingredients are low-priced simply because they have been traded as commodities for a very long time. This type of profile could be accepted in some markets, but is probably not good enough for most. However, it would be equally unwise to completely forget all the old ingredients. Ethyl methyl phenyl glycidate (FEMA# 2444), for instance, can still be used in strawberry flavors, so long as it assumes a secondary role and is not overdone. Similarly,  $\gamma$ -undecalactone (FEMA# 3091) is by far the best value peach lactone.

## Flavor Cost Composition

A study of the raw material cost composition of a flavor indicates that virtually all of it can be attributed to a minority of ingredients, with the majority making no significant contribution to the overall cost. This

suggests that it is generally better to start making a flavor with little regard to ingredient costs. Once a flavor that is in line with the customer's requirements is created, one can initiate cost-reduction measures.

## Cost-reduction Methods

**Compounding costs:** The first step in reducing flavor costs involves trimming the complexity of flavor. All flavors have an optimum level of complexity that is required to achieve maximum impact—addition of raw materials beyond this point simply muddies the picture and detracts from the overall flavor character. Though the optimum number of raw materials varies from flavor to flavor, using more than 40 ingredients is rarely justified; 20 is a good number to aim for, if one is trying to cut costs. Compounding costs are always directly related to the number of raw materials, so this step helps to reduce costs considerably, while increasing impact—a rare win-win situation!

Additionally, increasing the flavor strength not only cuts compounding costs, it also reduces the raw material costs associated with the solvents in the flavor. Sometimes this approach may be limited by the customer's ability to dose small quantities accurately, but it is worth taking as far as possible.

**Ingredient substitution:** Next, flavorists can look at the major cost-contributing ingredients. These will typically include vanillin (FEMA#

3107), maltol (FEMA# 2656), raspberry ketone (FEMA# 2588) and *cis*-3-hexenol (FEMA# 2563). In some cases, it is possible to find cheaper commoditized replacements for these ingredients. Maltol, for instance, can be replaced by ethyl maltol (FEMA# 3487), while vanillin can be substituted by ethyl vanillin (FEMA# 2464). In addition, while *cis*-3-hexenol can possibly be replaced by methyl heptene carbonate (FEMA# 2729), the cost savings in this case would be more than offset by the loss of flavor quality—invariably creating a need for another approach.

**Combination method:** This cost-reduction method is helpful, while adding little complexity to the formulation process. In addition, though it goes against the grain, its synergistic effects can help to reduce overall costs. Raspberry ketone presents a good example. Zingerone (FEMA# 3124) has an aroma that is highly complementary to raspberry ketone. As such, a mixture of 90% raspberry ketone and 10% zingerone can be used at half the level of 100% raspberry ketone. Similarly, a mixture of 8% vanitrope (FEMA# 2922) and 92% vanillin can be used



at half the level of 100% vanillin. A very small addition (1–2%) of *cis*-3-hexenyl hexanoate (FEMA# 3403) to *cis*-3-hexenol allows the level of *cis*-3-hexenol to be reduced to two thirds with little loss of quality.

**Smart sourcing:** The next approach is obvious, but worth a mention. If a flavorist's company produces any of the raw materials that make a significant cost contribution to his or her flavor formulation, it makes sense to use internal ingredients! While a competitor's label may seem curiously more attractive on a bottle, there is hardly any concrete reason to use a competitor's ingredient in preference to one's own.

**Sulfur chemicals:** Sulfur chemicals offer unique levels of flavor impact in relation to their cost contribution, yet very few flavors on the market contain these at optimum levels. Furthermore, many worry about overdosing sulfur chemicals and automatically tend to err on the side of caution. However, adding raw materials gradually is perhaps not the best approach; it is always better to overdose new sulfur raw materials and then quickly cut them back to the maximum level that is acceptable.

**Taste effects:** "Taste effect" is one area where small sacrifices can result in significant savings. Medium volatility chemicals are often much

more cost-effective than their higher molecular weight relatives. A simple example of this is the comparison between  $\delta$ -decalactone (FEMA# 2361) and  $\delta$ -dodecalactone (FEMA# 2401). Both chemicals are comparably priced; however,  $\delta$ -dodecalactone is much weaker on odor, but significantly stronger on taste. Therefore, an ideal mixture, taking into account taste effects, would employ more than twice as much  $\delta$ -dodecalactone as  $\delta$ -decalactone; however,  $\delta$ -decalactone, used alone, cuts the cost in use to a third.

**Flavor enhancers:** Unfortunately, true flavor enhancers are rare. Nonetheless, those few that actually work do offer a small, but significant, improvement in impact at negligible cost. Ethyl maltol, which can work at low levels in a wide range of flavors, is one good example.

**Process/margin reality check:** The other obvious cost-cutting measure is to carry out a reality check on all the cost contributing raw materials in the flavor. One's purchasing procedures and costing software may be a model of perfection, but in practice it likely contains some significant errors. In rechecking the key commodity raw material prices, a flavorist may well be able to find some significant adjustments, especially if he or she "credits" purchasing rather than themselves with discovering the savings.

Similarly, one should also carry out a reality check on the margin that has been assumed for any project. Flavor manufacturing is not a charity and companies need to make a decent profit, even on a cheap flavor. That said, organizations must make certain that the margin is at the lower end of their acceptable range, otherwise all other efforts will be a waste. It is usually wise to reach an agreement on the margin at the beginning of the project, as when—against all expectations—a flavorist creates a great flavor at a great price, he or she will inevitably face the short-sighted commercial temptation to push the margin up.

**Hard to replicate:** The final step in creating a great flavor in hard times is to ensure that competitors cannot match it. Matching flavors has always been a fairly futile, yet widely practiced exercise in most companies. This usually ends up exerting more pressure on the margins of the original supplier. One surely doesn't want to be in the position of trying to cheapen a flavor that is already as cheap as possible.

Beating competitors' efforts to match a flavor is great fun and, interestingly, the focus of this column in the next issue.

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