Balancing Taste and Health
Taste modifiers aid in the formulation of healthier products for the consumer.
By Wixon Inc.

Health and wellness are important to today’s consumers. More than ever before, they are committed to improving their lives and their children’s lives through exercise and healthier food choices. The stakes are indeed high with one in three children in America overweight or obese; more than one-third of adults obese; and heart disease, stroke, type 2 diabetes, and cancer all related to obesity.

Studies have shown that consumers are becoming more selective in their product and lifestyle choices. Consider these statistics from the International Food Information Council Foundation, the NRA and the USDA:

• 60 percent of shoppers say they regularly read product nutritional information;
• 61 percent of consumers choose food based on the healthfulness of the food or beverage;
• 78 percent of NRA chefs rank Healthy Kids’ Meals a #3 trend on the “What’s Hot in 2013” report.

But despite wanting to eat “good for you” foods, taste is still the #1 most important food attribute and consumers are not willing to compromise on that. In fact, “Half of consumers say that descriptors such as low salt, low fat and low sugar clearly signal health, yet strongly detract from the taste of food,” according to Technomic’s Healthy Eating Consumer Trend Report.

Therefore as food companies churn out products that provide better nutritional value with healthy ingredients (more fiber, less fat, more protein, lower levels of carbs), they are also challenged by the downside of adding healthy ingredients such as herbs, proteins, or vitamins because these additions also add off notes such as bitter flavor, unfamiliar aroma, and unpleasant mouthfeel. For example: when reducing fat, other flavors can come through disproportionately; when adding soy protein, a “beany” character may be introduced. Taste modifiers can improve the taste of food and often are used in meal replacement products, energy bars and sports drinks.

**What, where, when and why to use taste modifiers**

Taste modifiers are complex blends of flavor ingredients, which have little or no taste or smell on their own but complement, enhance or otherwise modify the flavor of a food product. Undesirable flavors can be suppressed while good flavors are accentuated.

Taste modifiers work in different ways depending on what they are masking and the food application. The function of taste modifiers is to trick a person’s palate, accomplished via taste modifier phenomena known as adaptation, cross-adaptation, taste-blocking, taste modification, taste suppression and taste synergism.

Adaptation and cross-adaptation are a form of fatigue. When the taste buds are continually exposed to a taste stimulus, the perception of a substance fades to almost nothing in seconds. Cross-
adaptation is when the adaptation of one taste may lower or increase the perception threshold of the other taste perceptions. For example, adding sugar to a cup of coffee.

Some known substances have the capacity to suppress all taste, and these are called taste blockers. Taste blockers also can repress a particular taste perception, such as cloves used for oral anesthetic.

The typical example of taste modification is through the sweetness-inducing protein miraculin found in the berries of the western African miracle fruit (Richadella dulcifica), which converts sour into sweet taste. One study at the University of Florida’s Center for Smell and Taste in Gainesville showed strawberries and lemons both became less sour and sweeter after miracle fruit intake. However miraculin is a heat-sensitive and pH-dependent protein, which limits its spectrum of potential uses.

A combination of modifying effects may deliver taste suppression and taste synergism. For example, when mixtures of sugars are used at lower concentration, synergism with the perception of enhanced sweetness occurs. When used at a high concentration, the sugar mixtures show a suppression effect with less sweetness than would be expected.

When using taste modifiers, consider that:

- Taste modifiers are very application-specific;
- Taste modifiers are additive ingredients because they are added on top of the undesirables;
- Taste modifiers “modify” the undesirables: excessive use may suppress desirable flavors in a food system;
- If the product or the process changes, the effectiveness of the taste modifier needs to be re-evaluated.

Before adding modifiers, look at the whole formula. Consider whether adjusting the sweeteners, acids, starches or fats will help suppress off notes. For minor problems, use standard commercially available taste modifiers to suppress certain specific off-flavors such as green notes, bitterness, astringency. For more complex problems, a combination of taste modifiers may be required. Taste is a delicate balance. If one taste perception is modified, the other tastes may become unbalanced. For example, when masking soy some excessive sweetness or sourness may appear. This may require adjustments in bulk increments or adding a second masking agent to balance.

Each challenge is unique and requires a unique approach. Ultimately the function of taste modifiers is to hide the negatives and accentuate the positives.

**More than a mask**

Taste modifiers are very application-specific and a complex process. Once a flavor is masked, another flavor may come through disproportionately. It requires a flavor chemist who understands how each flavor component acts independently and who can combine all needed flavor modifiers into one customized agent for a specific product. It is important to work with an established flavor house to ensure that the flavor does not react with any other ingredient in the food product, rendering it inactive. Creating the right masking agent requires great creativity to arrive at the best
combination of ingredients. Individual masking components may have limited masking capability but in combination may have synergy and consequently enhanced capability.

**Impact! Program flavor modifiers function and applications**

Wixon’s Impact! Program featuring Mag-nifique™ taste modifier technologies was developed proactively to address the new ingredients, product concepts, and market trends facing today’s food scientists and product managers. A complete line of Mag-nifique products allows food manufacturers to reduce sodium, fat and sugar without sacrificing flavor, and provides masking effects for added vitamins and other nutrients. They improve common sensory problems at very low levels and, in some cases, they can even reduce costs. Since the modifiers have very low use rates, typically 0.01% to 0.30%, their inclusion will not affect critical label claims or ingredient statements. Available in liquid and powder form, the natural, odorless products are water-soluble and heat-stable.

- **Herb & Botanical Solutions**: Many herbs and botanicals, whole grains and vegetable dishes are prone to green notes, grassy notes, and bitterness. Green Away masks the aftertaste associated with those notes. Applications include brown rice, vegetable juices, vitamins, and mineral compounds. Bitterless masks bitterness associated with nutraceuticals and caffeine-enhanced products, tropical juices, fruit infusions, and botanicals.

- **No Sugar Solutions**: For lower sugar/lower calorie products, Sweet Lift increases sugar perception. It delivers a low-glycemic index and allows the reduction of simple sugars while increasing complex sugars. This helps the functionality in healthy foods targeting weight reduction, blood sugar, and healthy aging. Sweet Lift is used in yogurt, smoothies, ice cream, cereal, natural fruit juices, and diet drinks. It is especially beneficial to food processors, snack food companies, healthcare facilities that do their own cooking, foodservice companies, and chefs who aim to lower the sugar levels in their foods and beverages. Mag-nifique for Stevia masks off notes associated with stevia usage. It is used in nutritional drinks, low-cal yogurt, fruit juices, sugar-free candy, diet drinks, low-sugar bars, zero calorie drinks, and sugar-free gum. There is no impact on the texture, nutritional panel, chemical behavior or heat stability of the product. It allows food product developers to actually reduce the usage of stevia while optimizing product taste. A smart choice for food processors, snack food companies, foodservice companies and more who seek to meet consumers’ demands for healthier food items.

- **Fortification Solutions**: Off-notes in vitamin enhanced and fortified products are reduced with Vita-Minimizer for use in baby foods, instant breakfasts, snack bars, smoothies, energy bars, vegetable drinks, and functional beverage formulations. Miner reduces the metallic and chalky aftertastes from minerals that are used in fortification such as nutritional beverages, instant shakes, drinks, baby foods, whey protein supplement drinks. Pro-No masks “beany” off notes associated with protein fortified products such as soy milk, non-dairy, soy fortified products, imitation meat products, and vegetable burgers. Astringency
Away reduces astringency perception in acidic products such as dressings and dips, as well as in soybean products such as soy milk.

- **Sodium Solutions**: In products with higher sodium levels, Salt Away preserves the function of salt while toning down its flavor impact letting other desirable flavors predominate. It provides a substantial benefit in sports drinks in which high amounts of isotonic salts are added to compensate for human dehydration from exercise; such salts produce an aftertaste that is objectionable to many. Mimic is a natural sodium reduction technology that suppresses the metallic notes and bitter aftertaste of potassium chloride used in low-sodium products, such as breads, meats and snacks, baby foods. Umami enhances savory notes in low sodium/no MSG products in prepared meats, soups, sauces, gravies, and snack dips. It provides synergy in complete meal systems.

- **Low-Fat Solutions**: Masking off notes associated with the addition of healthy fats is Magnifique for Omega 3, which prevents and eliminates the “fishy” taste commonly associated with omega-3 fatty acids. It can be used in any application where omega-3 fatty acids are incorporated, including beverages, desserts, baked goods and other uses. Mouthfeel is a natural flavor that creates the perception of creaminess and texture in reduced-fat or no-fat systems, such as low-fat yogurt, sour cream, and ice cream.

**Flavor modifiers for all stages of life**

Wixon’s Impact! Program addresses four major platforms that target long-term consumer concerns: Children’s Nutrition, Weight Management, Sports Fitness, and Baby Boomers.

- **Children’s Nutrition**: Through creation of healthier food, we can impact nutritional problems plaguing children. Over the past three decades, childhood obesity rates have tripled, and portion sizes are now two to five times bigger, hence the demand for greater nutrition in food products for children. Wixon’s complete line of children’s nutrition flavor modifiers helps create healthier, better tasting low-sugar products, flavorful reduced salt items, and appealing whole grain versions of traditional snacks, breads, pastas, and cereals.

- **Weight Management**: With obesity, diabetes, and other weight-related diseases on the rise, consumers need to understand they have options for healthy food choices that taste great and help them achieve weight management goals. Impact! Program is designed for food manufacturers to give their end-users more options for healthy food choices. Flavor modifiers can be used to reduce sugar, lower glycemic content, and enhance the overall satiety of food products, helping consumers control calorie intake, manage their weight and achieve health goals.

- **Sports Fitness**: For consumers who are improving their lives through exercise and healthier food choices, Wixon offers a line of Sports Fitness flavor modifiers that improve the taste of healthy foods and beverages, mask aftertastes common to high-protein powdered drinks, create great tasting low-glycemic products, minimize vitamin off-notes, and improve sweetness perception in low-calorie products.
• Baby Boomers: Boomers are about 25 percent of the U.S. population and look to food to help them with their healthy aging goals. Aging consumers are in search of food and beverages that satisfy their taste buds and maintain health. Flavor modifiers geared toward Baby Boomers helps meet that need by masking aftertastes, reducing bitterness, sugar, and sodium, and by increasing overall flavor for aging taste buds.