Flavorings – Clean and Friendly

Gary Reineccius
Flavor Research and Education Center
(Flavor.umn.edu)
Department of Food Science and Nutrition
University of Minnesota

October 28, 2013

www.GlobalFoodForums.com/CleanLabel
Presentation

- Labeling laws – what are they and options available to us legally?
- Labeling practices – what are the industry practices?
- Clean labeling – what can be done and what are the costs?
- Summary
Purposes of labeling

• To inform the consumer of:
  • Natural Vs. Artificial - Tell if the product contains artificial flavors.
  • To list specific ingredients of interest to consumer - e.g. antioxidants, colorants, msg.
  • Nutritional, allergens, other consumer issues
Flavor labeling regulations

- 21 CFR Paragraph 101.22

- Preamble - published in the Federal Register, volume 38, number 231, 12/3/1973
  
  - detail on why certain regulations were enacted
  - clarify key issues of the regulations
  - collection of comments made by public and interested groups
Natural flavoring

101.22(a)(3) The term "natural flavor" or "natural flavoring" means the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional. Natural flavors include the natural essence or extractives obtained from plants listed in 182.10, 182.20, 182.30, 182.40, and 182.50 and Part 184 of this chapter, and the substances listed in 172.510 of this chapter.
Basically ..... 

- Anything isolated from plant or animal sources, fermentations, or enzymatic action by extraction or distillation.

- Products of roasting (process flavorings)
Artificial flavoring

(a)(1) The term "artificial flavor" or "artificial flavoring" means any substance, the function of which is to impact flavor, which is not derived from a spice, fruit or fruit juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, fish, poultry, eggs, dairy products, or fermentation products thereof. Artificial flavor includes the substances listed in 172.5l5(b) and 182.60 of this chapter except where these are derived from natural sources.
Basically ....

- If it is not natural, it is artificial
Picture or Name

- Defines flavor and flavor is characterized by ingredients - Product does not contain any added artificial flavor which simulates, resembles or reinforces the named flavor.

- Natural flavor could be added and not be declared on the principle display panel -- but cherries, for example, must characterize and natural flavor listed in ingredient statement.
FIGURE 22-1. Natural flavor added to food with sufficient characterizing ingredients (above) is labeled "Cherry Pie"; natural flavor added to food with insufficient characterizing ingredients (below) is labeled "Natural Cherry-Flavored Pie."

Flavor added must be natural and cherry-like (can be a formulated flavor)
Artificial issue - How does one determine whether added flavor "simulates" a characterizing flavor?

- In determining whether added flavor does or does not simulate, resemble or reinforce the characterizing flavor, the principal test will be to separate such added flavor from the product to determine whether it tastes like the characterizing flavor or approximates the flavor characteristics of any principal flavor notes. Thus, vanillin added to chocolate would clearly not be a characterizing flavor because it does not taste like chocolate. (Open to interpretation?)
**Benzaldehyde** added to cherry juice - would be an artificial flavor because it does "reinforce and extend" the cherry taste. It must be emphasized that the test is not solely whether an artificial flavor simulates or is chemically identical to the characterizing, natural flavor, but also more broadly whether it *resembles*, *reinforces* or *simulates* it. (Open to interpretation?)

At the same time does not include all artificial flavor such as artificial flavor that merely modifies, rounds out or gives a particular cast to an existing flavor without reinforcing or increasing it or otherwise making it appear that more is present than is actually in the product.
If the cherries do not independently characterize

• Then must label as being naturally flavored on the front panel

• How do we decide if cherries alone characterize the product?

• Pull out added flavor and taste the product - taste like cherry? (Open to interpretation?)
Flavor added must be natural and cherry-like (can be a formulated flavor)

**FIGURE 22-1.** Natural flavor added to food with sufficient characterizing ingredients (above) is labeled "Cherry Pie"; natural flavor added to food with insufficient characterizing ingredients (below) is labeled "Natural Cherry-Flavored Pie."
Artificially flavored

- If any artificial flavor is added to a food which resembles, simulates or reinforces the named flavor, it must be labeled “Artificially flavored” on the front panel and be listed in the ingredient statement.

- Example: citral added to lemon pudding flavor
Would normally label this as “Natural and artificially flavored” (N&A). Showcase the natural part of the flavor system.
Adding other natural flavors

- If the flavor is natural and is derived totally from sources other than the product whose flavor is simulated, there are two choices:
  - *Artificially Flavored (bad choice)*
  - or
    - *With Other Natural Flavors (WONF)*
If there are other natural flavors added and the flavor contributed by the ingredients do not separately characterize the named flavor, then the front panel must say:

**FIGURE 22-3.** Natural lemon flavor with other natural flavor added to pudding is labeled “Lemon Pudding with other Natural Flavor.”
• If the ingredients do characterize the named flavor, then the “with other natural flavors” (WONF) can be added to the ingredient list and not appear on the principle display panel.

• NOTE: WONF must be put in ingredient statement.
If the finished product contains three or more distinguishable characterizing flavors or a blend of flavors with no primary recognizable flavor

- the flavor may be declared by an appropriately descriptive generic term

- e.g. Fruit Punch
If the product contains all natural flavors, it can be labeled “Naturally Flavored.” However, if all flavorings were artificial, it does not have to be labeled as “Artificially Flavored” on the front panel but must be listed in Ingredient statement.
Flavor Labeling
21CFR Paragraph 101.22(i)
Decision Pathway

FIGURE 22-7.  Flavor labeling decision pathway.
Incidental additives

- Incorporated into a food product as a component of an ingredient - no technical or functional effect.

- Ingredient statement.
Flavors

- Encapsulation matrix,
- flavor solvent,
- flavor preservative (such as an antioxidant that functions in the flavorings but not in the product – practice varies – some list it others do not.)
Processing aids

- Substances added during processing of final food to accomplish some effect.

  *for example:*
  - 1. water in cookies and crackers.
  - 2. clarification of beer - gums, gelatin
  - 3. anti-stick agents
  - 4. anti-dust/anticaking agents

- Not labeled in any way
Must label

- Antioxidants (BHA & BHT)
- Colors
- MSG - when added as such
Special claims

• All natural

• No additives

• Does not apply to GRAS substances (see CFR 182.1005 to 182.8997 and 184.1)

• They are not additives
Other label terms

- **Natural “name” Type Flavor** which indicants that the flavor is all natural, does simulate or resemble the name but does not contain any flavor ingredients from the named product.

- **Natural “Name” Flavor from the named fruit (FTNF).** All flavor materials are from the named fruit.

- Neither are FDA labeling terms.
Non flavor ingredients do NOT affect flavor name
Thermally process flavors (Natural flavors)

- Must adhere to some rules to not have to declare ingredients:
  - Made from amino acid(s), reducing sugar(s) and protein hydrolysate(s) heated to $\geq 100^\circ C$ at least 15 min.
  - Some ingredients must be declared:
    - Ingredients from animal and seafood sources
    - Thiamin hydrochloride
    - Salt
    - Complex carbohydrates
    - Acids
Organic labeling

- Typically not a major issue since natural flavors are permitted in organic (>95% “organic”) or “made with organic” (>75% organic). (7 CFR 205.605 (a))

- Products labeled as “100 percent organic” or “organic” and all ingredients identified as “organic” in the ingredient statement cannot use any flavors.
Honey Blueberry

Ingredients:
Cultured Pasteurized Grade A Milk, Sugar, Honey Powder, Natural Blueberries, Cultured Whey (To Maintain Freshness), Pectin, Natural Flavor

All our yogurts are gluten free.
WONF should likely be in the ingredient statement (front panel? – no since bb are adequate to characterize flavor)

Cultured Pasteurized grade A milk, Sugar, Honey Powder, Natural Blueberries, Cultured Whey (to maintain freshness), Pectin, Natural flavor)
- Cultured nonfat milk, raspberries, blueberries, blackberries, strawberries, modified corn starch, whey protein concentrate, natural flavors, gelatin, tricalcium phosphate, soluble corn fiber, pectin, agar, citric acid, cultured dextrose, sucralose, neotame, acesulfame potassium, vitamin a palmitate, vitamin d3, active cultures.
Front panel – good. Should WONF be in ingredient statement?

- Cultured nonfat milk, raspberries, blueberries, blackberries, strawberries, modified corn starch, whey protein concentrate, natural flavors, gelatin, tricalcium phosphate, soluble corn fiber, pectin, agar, citric acid, cultured dextrose, sucralose, neotame, acesulfame potassium, vitamin a palmitate, vitamin d3, active cultures.
What do you expect here?

Ingredients:
- Corn
- Whole grain wheat
- Sugar
- Whole grain rolled oats
- Brown sugar
- Rice
- Vegetable oil (canola or sunflower oil)
- Wheat flour
- Malted barley flour
- Salt
- Corn syrup
- Whey (from milk)
- Wildflower honey
- Malted corn and barley syrup
- Caramel color, natural and artificial flavor
- Annatto extract (color)
- BHT added to packaging material to preserve product freshness.

Vitamins and Minerals:
- Reduced iron
- Niacinamide
- Vitamin B6
- Vitamin A palmitate
- Riboflavin (Vitamin B2)
- Thiamin mononitrate (Vitamin B1)
- Zinc oxide (source of zinc)
- Folic acid
- Vitamin B12
- Vitamin D

Contains: Wheat, milk.
Natural and artificial flavors – label?

Since there is no characterizing flavor – no problem
What is characterizing flavor?

- Enriched Flour Bleached (Wheat Flour, Niacin, Iron, Thiamin Mononitrate, Riboflavin, Folic Acid), Sugar, Partially Hydrogenated Soybean And/Or Cottonseed Oil, Corn Syrup, Leavening (Baking Soda, Sodium Aluminum Phosphate, Monocalcium Phosphate), Modified Corn Starch, Propylene Glycol Monoesters Of Fatty Acids, Corn Starch, Dextrose, Salt, Distilled Monoglycerides, Dicalcium Phosphate, Maltodextrin, Xanthan Gum, Natural And Artificial Flavor, Yellows 5&6, Nonfat Milk.
Do blueberries characterize? Must not or artificial flavor is blueberry.

- Flour Bleached Enriched (Wheat Flour, Niacin Vitamin B3, Iron, Thiamine Mononitrate Vitamin B1, Riboflavin Vitamin B2, Folic Acid Vitamin B9), Blueberries Canned in Light Syrup (Blueberries, Water, Corn Syrup High Fructose), Sugar, Corn Syrup, Soybeans Oil Partially Hydrogenated, Cottonseed Oil Partially Hydrogenated, Corn Starch Modified, Baking Soda, Sodium Aluminum Phosphate, Salt, Corn Starch, Propylene Glycol Monoesters of Fatty Acids, Mono and Diglycerides, Sodium Stearoyl Lactylate, Citric Acid, Cellulose Gum, Xanthan Gum, Flavoring Artificial and Natural, Cream Cultured (Dried)
Difference between this and next?

INGREDIENTS: ENRICHED WHEAT FLOUR (FLOUR, NIACIN, IRON, THIAMINE MONONITRATE, RIBOFLAVIN, FOLIC ACID), WHEAT STARCH, SALT, BEEF FAT, HYDROLYZED SOY, WHEAT, AND CORN PROTEIN, ONION, CARAMEL COLOR, CORN SYRUP SOLIDS, SODIUM CASEINATE (MILK), SPICES (INCLUDING WHITE PEPPER), GARLIC, NATURAL FLAVOR, DISODIUM INOSINATE AND GUANYLATE (FLAVOR ENHANCERS), EXTRACTIVES OF PAPRIKA, AND YEAST EXTRACT.
Should say WONF in ingredient statement?

Why on front panel?
Artificially flavored

JELLO, GELATIN DESSERT, CHERRY
INGREDIENTS: Sugar, Gelatin, Adipic Acid (for Tartness), Contains Less than 2% of Artificial Flavor, Disodium Phosphate and Sodium Citrate (Control Acidity), Fumaric Acid (for Tartness), Red 40, Blue 1.
Costs of keeping artificial off the label?
Cost of clean label (artificial flavors)?

- Ethyl butyrate FCC $ 5.00/kg
- Ethyl butyrate, Natural $12.00
- Butyric acid FCC $ 5.20
- Butyric acid natural $ 9.50
- Linalool FCC $13.50
- Linalool (Coriander Oil Terpeneless) $45.00
- Linalool (Ex Bois de Rose) $280.00
- cis-3-Hexenyl acetate (leaf acetate) FCC, $74.00
- cis-3-Hexenyl acetate (leaf acetate) Natural, $650.00
- Gamma-Decalactone Natural, $300.00
- Gamma-Decalactone, $20.50

Source: Chemical Land 21 (http://www.chemicalland21.com/)
Alpha Irone

- Alpha Irone (artificial)  $643.00
- Alpha Irone (Natural)    $85,714
Ethyl Butyrate - label

- Artificial (artificial) $27.00
- Biotechnology (natural) $95.00
- From Orange juice (product only) $1,050.00
Opportunity for clean label

• Natural vs artificial
  • If it resembles, reinforces or simulates the named flavor – label on front of pkg.
  • If it does not, list in ingredient statement

• WONF
  • Characterizing ingredient – list in ingredient statement
  • Inadequate characterizing ingredient – front panel and ingredient statement

• WONF – frequently ignored in ingredient statement
Clean label

- Flavor manufacturer
  - Natural flavor – is that possible?
  - Artificial – does it simulate, resemble or reinforce named flavor
- Flavor carriers – known to consumer (friendly?)
- Internal practices – corporate image, practices
- Flexible in labeling – interpretations of characterization, or simulation
- Market practices (brand leader)
- Disadvantage to not do so
Credits:

- Charles Manley, Consultant, Charles H. Manley LLC

- Kimberly Janec, Director, Corp Safety & Regulatory AffairesTakasago International Corp.