



## Organoleptic Characteristics of Flavor Materials

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It was much easier to create vanilla flavors years ago, when the vast majority of formulations were artificial or (at best) natural and artificial. The only standards of identity were for ice cream vanilla flavors — Category I, an all natural product; Category II, a blend of natural vanilla and an equal fold of vanillin; and Category III, the general realm of artificial vanilla flavors. In those days, all artificial vanilla flavors contained a repertoire of common ingredients that were dissolved in a few basic solvents and contained sufficient caramel color to give the impression of a natural extraction. Whatever concentration of natural vanilla extract it contained was miniscule at best, often from inferior Indonesian beans. The natural was often added just for label purposes.

How things have changed in just a few years!

Let's review the basics that are still valid today. Fold is the term used to categorize the flavor strength of all vanilla flavors — natural, natural and artificial, and artificial. A fold of natural vanilla is defined as the number of units of vanilla constituent used to manufacture one gallon of finished product. The term unit of vanilla constituent is defined by the FDA in the Federal Vanilla Standards as the total sapid and

odoriferous principles extracted from not less than 13.35 oz of vanilla bean per gallon of extract. The standard also states that the finished extract should contain at least 35 percent by volume of ethyl alcohol.

Category II vanilla is a pure vanilla of any fold with the addition of a comparable fold of vanillin per gallon. Or, to be more specific, a two-fold Category II is a gallon of one-fold natural vanilla plus 1 oz of vanillin per gallon. A four-fold comprises two-fold of natural vanilla extract plus 2 oz of vanillin per gallon, etc.

Artificial vanilla flavors are usually made up of specific aromatic ingredients that are all related to vanillin in relative fold values and are incorporated in various ratios or proportions relative to the material's intended end product.

The repertoire of ingredients found in the majority of natural and artificial and artificial vanilla flavors usually include vanillin, ethyl vanillin, heliotropine, veratraldehyde, benzo dihydro pyrone, vanitropine and 6-methyl coumarin.

The ratio of fold values is based on the principle that 1 oz of vanillin per gallon of suitable solvent is equivalent to a gallon of natural vanilla extract. The accepted equivalency of fold values is:

ethyl vanillin	equal to three times the strength of vanillin USP
heliotropine	equal to two times the strength of vanillin USP
veratraldehyde	equal to the strength of vanillin USP

benzo dihydro pyrone	equal to three times the strength of vanillin USP
vanitrope	equal to 20 times the strength of vanillin USP
6-methyl coumarin	equal to five times the strength of vanillin USP

Today, as with most flavored end products, the emphasis is on natural flavors, especially the vast array of source-specific natural extracts, natural fractions and distillates. I have gathered a series of organoleptic evaluations for some older artificial ingredients now available as naturals. I've also included herein a representative assortment of various natural vanilla extracts derived from newer vanilla bean sources and newer extraction and/or concentration processes.

## Evaluations

### Anisic Aldehyde (Synonym: Para Methoxy Benzaldehyde)

Source: Fleurchem

FEMA# 2670, CAS# 123-11-5, Natural

Natural occurrence: Vanilla, fennel, star anise, cranberry, black currant, cinnamon, basil.

Odor: @ 1.0 percent. Sweet powdery, spicy creamy, fruity, vanilla and hay-like. Coumarin, almond, anisic with berry nuances.

Taste: @ 5-10 PPM. Sweet powdery, vanilla creamy, spice anise, nutty, cherry pit and almond-like nuances.

Possible applications: Vanilla, almond, black cherry, cocoa, coumarin, licorice, cinnamon, anise, peppermint modifier.

►Fleurchem; tel: 845-341-2100; [www.fleurchem.com](http://www.fleurchem.com)

### Balsam Peru Resin

Source: Charabot

FEMA# 2116, CAS# 8007-00-9, Natural

Odor: @ 1.0 percent. Sweet spicy vanilla bean, woody fruity balsamic with cinnamon resinous notes.

Taste: @ 10 PPM. Sweet musty balsamic vanilla, powdery with fruity cherry, woody and spicy cinnamon resinous nuances.

Possible applications: Vanilla, cocoa, tobacco, cinnamon, honey, clove, cherry, berry nuances, dried fruit.

►Charabot; tel: 845-398-1200; [www.charabot.com](http://www.charabot.com)

### Benzodihydro Pyrone (Synonym: Tonkalide, 2,3-Dihydrocoumarin)

Source: Citrus & Allied

FEMA# 2381, CAS# 119-84-6, Nature identical

Natural occurrence: Sweet clover and deertongue.

Odor: @ 1.0 percent. Sweet, spicy coconut, coumarin, vanilla, hay-like, anisic and creamy, with herbaceous tobacco and lactonic nuances.

Taste: @ 10 PPM. Vanilla, coumarin, cooked sugar caramel, toasted coconut with tobacco and hay-like nuances.

Possible applications: Vanilla, cassia, coconut, almond, tobacco, cream flavors, macadamia and cashew nut, coumarin replacers, cotton candy, floral nuances for cherry, caramel, vanilla ice cream notes.

►Citrus & Allied; tel: 718-343-0030; [www.citrusandallied.com](http://www.citrusandallied.com)

### Ethyl Vanillin Isobutyrate

Source: Fleurchem

FEMA# 3837, Artificial

Not found in nature.

Odor: @ 1.0 percent. Intense sweetness, creamy, vanilla-like with vanilla ice cream and milk chocolate nuances. The dry out is slightly caramel and rummy.

Taste: @ 5-10 PPM. Sweet creamy vanilla with powdery and balsamic ice cream and cardboard nuances.

Possible applications: Vanilla ice cream, chocolate, malted milk, cappuccino, caramel, butter rum, orange creams, bubble gum, bakery vanilla applications, dairy applications in general.

►Fleurchem; tel: 845-341-2100; [www.fleurchem.com](http://www.fleurchem.com)

### Heliotropine (Synonym: Piperonal)

Source: Bell Flavors

FEMA# 2911, CAS# 120-57-0, Natural

Natural occurrence: Tahitian vanilla, camphor wood, violet flowers, burley tobacco, dill, sherry.

Odor: @ 1.0 percent. Sweet, anise-like, almond vanilla, floral, black cherry pit, berry raspberry, powdery coumarin-like with a hint of hay.

Taste: @ 10-50 PPM. Ripe black cherry fleshy, ripe berry, sweet, macaroon, Jordan almond, creamy vanilla, spicy cream soda, coumarin, slight floral with hay nuances.

Possible applications: Wild and black cherry, vanilla, cola, rum, almond, coumarin, sherry, cream soda, peach.

►Bell Flavors; tel: 847-291-8300; [www.bellff.com](http://www.bellff.com)

### 6-Methyl Coumarin

Source: Givaudan

FEMA# 2699, CAS# 92-48-8, Artificial

Not reported found in nature (yet).

Odor: @ 1.0 percent. Sweet vanilla cake, creamy, coconut, coumarin-like and powdery, with herbaceous hay and tonka-like nuances.

Taste: @ 5 PPM. Coconut, sweet vanilla, dairy creamy, hay-like with anisic and coumarin nuances.

*Possible applications:* Vanilla, coumarin replacements, caramel, coconut dairy notes, brown sugar, tonka bean notes, dulce de leche.

► **Givaudan**; tel: 513-948-8000;  
www.givaudan.com

### Vanilla Absolute C-1577 10 percent

Source: Berje

Natural

*Odor:* @ 1.0 percent. Sweet rich creamy vanilla with coumarinic castoreum leathery and beany nuances.

*Taste:* @ 5 PPM. Vanilla, sweet creamy, milky, preserved fruity prune, animal leathery with beany woody nuances.

*Possible applications:* Vanilla, creams, all purpose vanilla replacement. Suitable for Category I applications.

► **Berje Inc.**; tel: 973-748-2870;  
www.berjeinc.com

### Vanilla Absolute Extract #0310603

Source: Moore Ingredients

Natural

*Odor:* Neat. Sweet, vanilla, smoky, spicy, phenolic, oak woody, and beany with a strong balsamic and resinous background.

*Taste:* @ 0.05 percent. Sweet, phenolic, balsamic, resinous, mildly astringent vanilla with an oak woody and beany background.

*Possible applications:* Vanilla, chocolate, milk, caramel, butterscotch, baked goods, confections, cola beverages, cream soda.

► **Moore Ingredients**; tel: 513-881-7144;  
www.moorelab.com

### Vanilla Bean Extract Ugandan #04-045-01

Source: Moore Ingredients

Natural

*Odor:* Neat. Sweet, faint smoky, spicy clove, woody vanilla, slightly brown, cooked, creamy dairy notes, cane sugary with molasses and raisin nuances.

*Taste:* @ 0.05-0.25 percent in 5 percent sugar. Sweet vanilla, fruity almost cooked, faintly woody.

*Possible applications:* Vanilla, tea, honey, brown sugar, molasses, raisin, nutty nuances, rum, bourbon whiskey, caramel, chocolate, tobacco, bakery applications.

► **Moore Ingredients**; tel: 513-881-7144;  
www.moorelab.com

### Vanilla Distillate: Natural and Organic

Source: Moore Ingredients

Natural

*Odor:* Neat. Sweet, spicy eugenol, vanilla with woody and dairy creamy nuances.

*Taste:* @ 0.1 percent in 5 percent sugar. Smoky vanilla, vanillin, brown beany with a dairy afternote.

*Possible applications:* General vanilla applications, clear cordials and beverage uses, ice cream.

► **Moore Ingredients**; tel: 513-881-7144;  
www.moorelab.com

### Vanilla Extract: CO<sub>2</sub> Extract

Source: Danisco

Natural

*Odor:* @ 1.0 percent. Smooth, sweet vanilla beany with some creamy and brown hay-like nuances.

*Taste:* @ 12.5 PPM. Sweet vanilla/vanillin with creamy brown phenolic nuances.

*Possible applications:* General vanilla uses, various baked goods, chocolate and honey.

► **Danisco**; tel: 201-444-9821; www.danisco.com

### Vanilla Extract, Papua New Guinea

Source: Moore Ingredients

Natural

*Odor:* Neat. Dry. Sweet slightly smoky, beany, creamy, weakly vanilla with a slightly spicy clove, phenolic and balsamic and resinous nuance. It has hints of veratraldehyde and methyl salicylate.

*Taste:* @ 0.1-0.2 percent in 5 percent sugar. Drying and astringent vanilla with sweet smoky spicy, slightly buttery creamy nuances.

*Possible applications:* Clear beverages, root beer, alcoholic beverage smoothers, vanilla nuances, chocolate, tobacco flavors, dairy nuances.

► **Moore Ingredients**; tel: 513-881-7144;  
www.moorelab.com

### Vanilla Oleoresin 20-Fold

Source: Danisco

Natural

*Odor:* @ 10 percent. Sweet balsamic, beany vanilla, powdery and full-bodied with anamallic nuances.

*Taste:* @ 100 PPM in 5 percent sugared milk. Sweet, woody, balsamic, vanilla, creamy, beany with brown and phenolic nuances.

*Possible applications:* Vanilla notes in general, baked goods, chocolate, cola beverages.

► **Danisco**; tel: 201-444-9821; www.danisco.com

### Vanillic Acid (Synonym: 4-Hydroxy-3-Methoxy Benzoic Acid)

Source: Aldrich

FEMA# 3988, CAS# 121-34-6, Nature identical

*Natural occurrence:* Guava, grape, brandy, rum, whiskey, sherry, red and white wines, Scotch and Canadian whiskey.

*Odor:* @ 5 percent. Weak vanilla, creamy, milky

dairy-like with a slightly woody balsamic raisin-like nuance.

*Taste:* @ 100 PPM. Weak sweet resinous vanilla, creamy with a smooth sweetness and body, slightly chocolate-like with a spicy vanitrope nuance.

*Possible applications:* Caramel, butterscotch, dulce de leche, condensed milk, vanilla, macadamia nut, chocolate, coumarin replacers, cream flavors, dried fruits such as raisin and prune, cookie dough, whiskey and cognac flavors.

► **Sigma-Aldrich**; tel: 800-325-5832;  
[www.sigmaaldrich.com](http://www.sigmaaldrich.com)

### **Vanitrope (Synonym: Propenyl Guaethol)**

*Source:* Polarome

FEMA# 2922, CAS# 94-96-0, Artificial

Not reported found in nature.

*Odor:* @ 1.0 percent. Vanilla, sweet, spicy, slightly phenolic with a heliotropine-like creaminess.

*Taste:* @ 25 PPM. Vanilla, spicy, sweet nutty, anisic with a biting creaminess.

*Possible applications:* Vanilla, root beer, anise, caramel, brown sugar, malt, nut flavors, coconut.

► **Polarome**; tel: 201-309-4500;  
[www.polarome.com](http://www.polarome.com)

### **Veratraldehyde (Synonym: Methyl Vanillin)**

*Source:* Polarome

FEMA# 3109, CAS# 120-14-9, Nature identical

*Natural occurrence:* Essential oils of cymbopogon and jananensis.

*Odor:* @ 1.0 percent. Phenolic, sweet vanilla, powdery, slightly woody with a candy and cocoa creaminess.

*Taste:* @ 50 PPM. Phenolic, vanilla, sweet powdery cocoa, creamy, cherry-like with phenolic and balsamic nuances.

*Possible applications:* Vanilla, cocoa, cream, caramel, coumarin replacers, mint nuances.

► **Polarome**; tel: 201-309-4500;  
[www.polarome.com](http://www.polarome.com)

p&f

