



Earthy, Musty, Mushroomlike Aroma Chemicals

Applications in flavors

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I like most living things but mosquitoes are an exception. I travel a lot, which makes malaria very near the top of my “things to avoid” list. That goes a long way toward explaining why the discovery that mosquitoes are attracted to the 1-octen-3-ol in cow breath did little to endear this idiosyncratic little flavor chemical to me. Nevertheless, my curiosity overcame caution (who wants a house that smells like cow breath?) and I experimented with adding it to the bug zapper in my yard. The practical effect could not be described as obvious. Possibly it worked, but the device now had the capacity to attract mosquitoes from all the houses in Princeton, New Jersey. It’s also possible it didn’t work at all. Perhaps the mosquitoes in the Princeton area are blissfully unacquainted with cow breath.

1-Octen-3-ol (FEMA #2805, CAS #3391-86-4; **F-1**) has a very strong earthy aroma that is characteristic of raw mushrooms. There are only a few flavor ingredients that have a similar character. All of them are somewhat less useful in flavors. 1-Octen-3-one (FEMA #3515, CAS #4312-99-6) has a slightly similar profile, but with



much more of a cooked character than 1-octen-3-ol’s raw, earthy note. 1-Hepten-3-ol (FEMA #4129, CAS #4938-52-7) also has a raw earthy character, but the mushroom note is a little less pronounced. Octan-3-ol (FEMA #3581, CAS #589-98-0) is somewhat mushroomlike but is also distinctly musty. Octa-1,5-dien-3-ol (FEMA #4732, CAS #83861-74-9) has an interesting earthy, raw mushroom note as well, but it is combined with an herbal character that reduces the compound’s usefulness.

Away from the obvious area of aliphatic chemicals, 2-phenyl acet-aldehyde dimethyl acetal (FEMA #2876, CAS #101-48-4) has a pungent raw mushroom profile but the associated floral character makes it uniquely well-suited to kewra instead of mushroom flavors. 1-Furfuryl pyrrole (FEMA #3284, CAS #1438-94-4) is somewhat characteristic of raw mushrooms but, in this case, the character is augmented by a cooked, brown note.

Vegetable Flavors

Raw mushroom: Few ingredients are quite as characteristic of a food product as 1-octen-3-ol is of raw mushrooms. Levels of use vary but

1,000 ppm is a good starting point. The levels given throughout this article are those suggested for use in flavors that are intended to be dosed at 0.05% in a ready-to-drink beverage or a simple bouillon.

Cooked mushroom: As mentioned earlier, the corresponding ketone is more characteristic of cooked mushrooms, but an optimal result can be achieved by using a mixture of the two ingredients.

Tomato: This ingredient can work well to add depth and realism to processed tomato flavors at a surprisingly high level—up to 150 ppm.

Corn: The character of toasted corn is quite hard to reproduce in snack flavors and 1-octen-3-ol is useful at around 100 ppm in this regard.

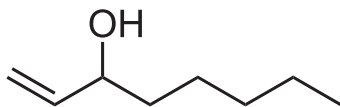
Onion: 1-Octen-3-ol is not helpful in fresh onion or chive flavors but it can add depth and realism to fried onion flavors at around 50 ppm.

Garlic: The effect in fried garlic flavors is very similar to that in onions. Similar levels can be used.

Cucumber: The dominant unsaturated aldehyde character of cucumber flavors can easily seem thin and harsh. Subtle additions of this ingredient, in the region of 50 ppm, round out the profile nicely.

1-Octen-3-ol

F-1



Nut Flavors

Peanut: 1-Octen-3-ol only contributes a part of the characteristic earthy note of peanut flavors, but it is highly useful at around 200 ppm.

Walnut: Similar to its effect in peanut flavors, this compound only provides part of the earthy walnut profile, although the effect is less pronounced. Ideal levels of use are in the range of 50 ppm to 100 ppm.

Hazelnut: Even more subtle dose rates are required for hazelnut flavors, ideally around 40 ppm.

Meat Flavors

Roast beef: This chemical adds an attractive complexity to roast beef flavors, enhancing the cooked effect. Levels of use can vary radically, but 100 ppm is a good place to start. Similar levels work well in lamb and liver flavors.

Chicken: This same complexity can be very useful in chicken flavors, especially when a roasted note is desired. Similar, or slightly lower, levels than those used in beef flavors are effective.

Pork, ham and bacon: An effective level in all three types is 50 ppm, but higher levels can be used.

Dairy Flavors

Blue cheese: Quite high levels of 1-octen-3-ol, around 300 ppm, can be very effective in blue cheese flavors, adding a degree of earthiness but also modifying and rounding out the dominant ketone character.

Cheddar cheese: Levels can vary in cheddar type cheese flavors, ranging from very low levels, around 10 ppm, in a mild flavor up to as much as 200 ppm in flavors with a pronounced, sharp, aged character.

Condensed milk: Condensed milk flavors generally only require moderate levels of this ingredient, ranging from 100 ppm to 150 ppm.

Sour cream: An appropriate level of use in sour cream flavors is 100 ppm; higher levels can become earthy.

Butter: Even more subtle levels, from 20 ppm to 50 ppm, work well in butter flavors.

Fruit Flavors

Cherry: At first sight this ingredient does not seem especially interesting

for fruit profiles, but it does accentuate the skin and astringent characters, especially in cherry flavors. Levels of use vary, up to 200 ppm in sour cherry types.

Black currant: The effect in black currant flavors is similar to that in cherries, but the ideal level is a little lower, around 100 ppm.

Passion fruit: At around 50 ppm this component adds to the astringent effect of this flavor.

Peach: Levels around 50 ppm are effective in peach, nectarine and apricot flavors, adding a pleasant skin character.

Grape: Levels vary, from slightly higher in red grape flavors to lower in white grape flavors, but 50 ppm is, once again, a good starting point.

Gooseberry: Even though the ideal level is only around 20 ppm in gooseberry flavors, the effect is still noticeable in this subtle flavor profile.

Brown Flavors

Brown sugar: Levels vary considerably depending on the degree of molasses character but can reach 100 ppm.

Vanilla bean: This chemical contributes to the realistic character of vanilla beans. A good starting point is 100 ppm.

Tea: Levels depend on the type of tea and are higher in black tea types, in the range of 50–100 ppm.

Coffee: 1-Octen-3-ol is a less important component of coffee flavors, but still adds a subtle level of realism at around 30 ppm.

Chocolate: The effect in chocolate flavors is quite subtle, adding a little to the powdery character of cocoa at around 20 ppm.

Malt: The function in malt flavors is quite similar. A good level in this flavor type is 20 ppm.

Alcoholic Drink Flavors

Rum: This is a useful ingredient in both light and dark rum styles, ideally at around 100 ppm for a flavor.

Whisky: 1-Octen-3-ol adds subtle realism at levels as low as 30 ppm in whisky flavors.