



Dec-9-en-2-one

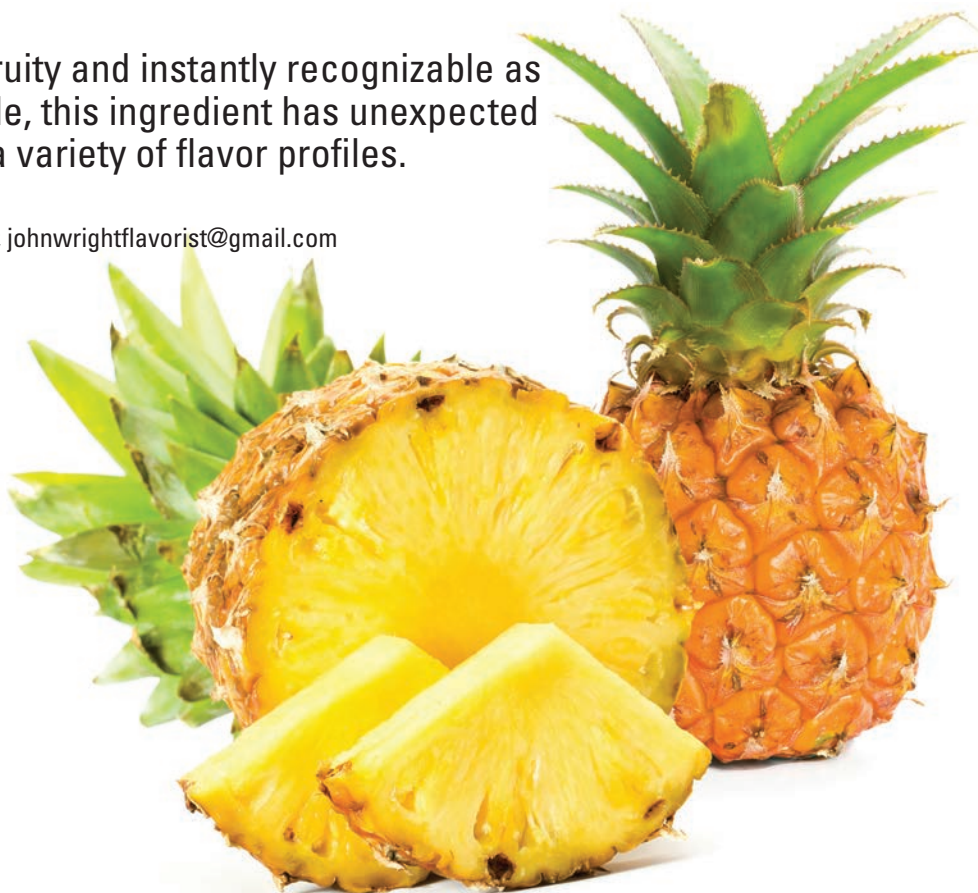
Sharp, fruity and instantly recognizable as pineapple, this ingredient has unexpected uses in a variety of flavor profiles.

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Throughout most of my career as a flavorist the industry has been driven to a large extent by its gradually increasing ability to analyze nature. For some flavorists, nature presents a complete template to be painstakingly recreated and tentatively optimized. For other flavorists, and I count myself amongst this latter group, nature is not really seen as an ideal or fixed template. Nevertheless, even for us, nature is at the very least a rich source of ideas and guidance. Raw materials that are highly useful, difficult to replace and yet are not found in nature are a source of mild irritation and frustration. Allyl hexanoate (FEMA# 2032, CAS# 123-68-2) was, for many years, in this category. The eventual discovery of this chemical in nature did not do much to lessen the frustration because it was present at levels far too low to have much effect. This was especially true of pineapple flavors, where allyl hexanoate had seemed to be central to achieving a realistic profile.

The discovery of dec-9-en-2-one (FEMA# 4706, CAS# 35194-30-0; principal FEMA name: 9-decen-2-one) in pineapples went a long way toward solving the problem. The character of this chemical is somewhat similar to allyl hexanoate. It is sharp and fruity in a similar way to allyl hexanoate and instantly recognizable as pineapple. It fits equally well into pineapple flavors, adding brightness and freshness. In some ways it is preferable because it has a higher level of the dry, almost dusty, note that is reminiscent of the fresh fruit.

Despite the fact that this ingredient is so reminiscent of pineapples, that does not mean that it will not work in other flavor profiles. There are many diverse and unexpected uses for this intriguing raw material.



The dose rates given throughout this article are the levels suggested for use in flavors that are intended to be dosed at 0.05% in a ready-to-drink beverage or in a simple bouillon.

Tropical Fruit Flavors

Pineapple: Levels of use in pineapple flavors can vary considerably but never reach the artificially high and synthetic tasting levels that are sometimes typical of allyl hexanoate when used with a heavy hand. A level of 5,000 ppm is a good starting point.

Mango: Dec-9-en-2-one works almost equally well in mango flavors, adding a fruity note that is realistic without becoming candy-like at levels around 1,000 ppm.

Passion fruit: As with pineapple, passion fruit flavors can accommodate widely differing levels of dec-9-en-2-one, ranging from 50–300 ppm. Higher levels work better in more tropical, sulfurous, catty flavors.

Melon: Two hundred ppm of this ingredient adds a hint of dryness and authenticity to all of the many different

types of melon flavors, from cantaloupe to watermelon.

Banana: Lower levels are more appropriate in banana flavors, giving a subtle skin effect and increasing realism. One hundred ppm is probably an ideal level.

Lychee: A similar level, around 100 ppm, also works well in the very subtle profile of lychee flavors, again giving an attractive hint of dryness.

Durian: Durian flavors are an acquired taste but the dominant sulfurous character must be underlaid by an attractive creamy fruitiness. This ingredient can work well at 100 ppm.

Soursop: Only subtle levels are needed here, ideally around 50 ppm, in realistic soursop flavors.

Kiwi: Once again, only a trace is needed to add a hint of skin and realism. A level of 50 ppm is ideal.

Citrus Flavors

Orange: The level of fruity notes is distinctly higher in orange flavors that lean toward fresh juice than those lean toward orange peel. Fifty ppm of dec-9-en-2-one works well in peely flavors

but juicy flavors can easily accommodate 500 ppm.

Tangerine and mandarin: Higher levels, in the region of 400 ppm, generally work best in both tangerine and mandarin flavors.

Grapefruit: As with orange, the ideal level in grapefruit flavors depends on the level of juice character but 100 ppm is a good starting point.

Lemon: This ingredient only plays a minor role in lemon flavors but can add an interesting twist at 30 ppm.

Berry Flavors

Cranberry: A level of 500 ppm of dec-9-en-2-one adds considerable realism and impact to cranberry flavors and offsets the sweeter components very nicely.

Blueberry: The dry, skinlike nuance of this ingredient is also very helpful in blueberry flavors. Four hundred ppm is a good starting point.

Strawberry: Higher levels are not helpful in strawberry flavors; adding a hint of dryness but a subtle addition, around 100 ppm, adds interesting complexity and realism.

Raspberry and blackberry: Low levels, in the region of 50 ppm, add an interesting twist and more authenticity to both raspberry and blackberry flavors.

Other Fruit Flavors

Apple: This ingredient works extremely well in apple flavors at 1,000 ppm, adding brightness and enhancing the apple skin character.

Cherry: The best level of dec-9-en-2-one varies with the style of cherry flavors. Very fruity flavors can accommodate 500 ppm, but more subtle flavors work best with much lower levels of addition, around 100 ppm.

Peach: The enhanced skin effect is also helpful in peach flavors; 300 ppm is a good place to start.

Pear: Skin notes are also useful in pear flavors, and 300 ppm of this ingredient is also a useful level of addition in this group of flavors.

Grape: More subtle levels are to be preferred in most types of grape flavors, typically around 50 ppm, although higher levels work in red grape flavors.

Other Flavors

Bread: Although this ingredient seems to fit entirely within the fruit category, there are a number of interesting uses

in quite different areas. The dry note is very well suited to bread and dough flavors at around 300 ppm.

Rum: Spirits, such as rum, aren't unexpected applications for this material. Levels of addition in the area of 300 ppm also work well in rum flavors. Lower levels, around 50 ppm, work better in whisky and brandy flavors.

Walnut: Nut flavors, especially walnut flavors, benefit from moderate additions, around 200 ppm, of dec-9-en-2-one.

Cheese: A level of 100 ppm adds an interesting cheddar fruitiness to cheese

flavors, coupled with a hint of dry rind.

Chicken: This is another very surprising application but 100 ppm adds a hint of the subtle dryness that is so characteristic of white chicken flesh.

Coconut: A level of 100 ppm adds a nuance of coconut milk to authentic coconut flavors, although higher levels can also be used, giving an unrealistic but distinctly pleasant candy note.

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