



5-Methyl-2-phenyl-2-hexenal

This cocoa bean component is key in chocolate, coffee and more.

John Wright; johnwrightflavorist@gmail.com



5-Methyl-2-phenyl-2-hexenal (FEMA# 3199, CAS# 21834-92-4) is, in my opinion, the single component in cocoa beans that is most directly responsible for their characteristic aroma. Despite the fact that the ingredient seems to be so very product-specific, it is found quite widely in nature and can be used in a broad range of distinctly different flavor categories. Other commonly used ingredients with a similar profile include 2-phenyl-2-butenal (FEMA#3224, CAS# 224-567-0), which is predominantly cocoa in character but is distinctly more floral, and 4-methyl-2-phenyl-2-pentenal (FEMA# 3200, CAS# 247-869-4), which is strongly cocoa and works well when used in conjunction with 5-methyl-2-phenyl-2-hexenal, especially in cocoa and nut flavors. (+/-)-4-Methyl-2-phenyl-2-hexenal (FEMA# 4194, CAS# 26643-92-5) is an interesting variant with a similar character, but is perhaps slightly less effective in use. The dose rates given below are the levels to be used in flavors that are intended to be dosed at

0.05% in a ready-to-drink taster, beverage or bouillon. They all assume that the chemical is used alone, without other members of the same family.

Brown Flavors

Cocoa and chocolate: This is an essential ingredient in cocoa and chocolate flavors. Levels can vary from as low as 100 ppm to as high as 2,000 ppm, but around 400 ppm is probably ideal. Despite the fact that this chemical has a very specifically cocoa aroma, high levels of use are by no means restricted to cocoa and dark chocolate flavors—it works very well in milk and white chocolate flavors at equally high levels.

Coffee: Similarly high levels can also work very well in coffee flavors, especially higher roast flavors. The impression is very helpful because it conveys roasting without any harsh or burnt character. A level of 800 ppm is a good starting point.

Malt: 5-Methyl-2-phenyl-2-hexenal is found naturally in malt and can play a very useful role at moderate levels, ideally

around 100 ppm. Higher levels can work well when the flavor intends to convey a mixed profile of malt and chocolate.

Maple: This ingredient may be overwhelmed in maple flavors based around fenugreek and related ingredients, but it can be subtly helpful in flavors that aim to reproduce the character of genuine maple syrup at around 50 ppm.

Tea: The role of this ingredient in tea flavors is even more subtle, but levels in the region of 50 ppm can be important in both black and green tea flavors, adding depth and complexity.

Nut Flavors

Peanut: This ingredient is also found naturally in peanuts and adds considerable depth and realism to roasted peanut flavors at around 200 ppm.

Hazelnut: It is also found in hazelnuts, and the effect in hazelnut flavors is a little more subtle, with the ideal level of addition being in the region of 100 ppm.

Praline: The effect is similar to hazelnut flavors, but a wider range of use levels are practical, typically around 100 ppm. However, depending on the profile, usage levels can reach up to 200 ppm.

Pistachio: Lower levels, around 50 ppm, work well in pistachio flavors, adding depth and realism, plus welcome complexity.

Almond: Almond flavors are often far too dependent on benzaldehyde for their impact, and 50 ppm of 5-methyl-2-phenyl-2-hexenal provides interesting complexity.

Savory Flavors

Soy sauce: At first this may seem to be a strange ingredient for a soy sauce

flavor, but there is a hint of chocolate character in the best quality soy sauces. Modest levels, in the region of 100 ppm, work very well.

HVP: In a similar way, levels of 5-methyl-2-phenyl-2-hexenal between 50 ppm and 100 ppm work very well in hydrolyzed protein and yeast flavors, adding a degree of richness and complexity to what can often be a simplistic profile.

Potato chips and french fries: Ensuring that potato chips and french fried potatoes have an attractive character is a difficult challenge because of the processing conditions. This chemical can make a useful contribution in flavors at a level of about 100 ppm.

Roast beef: The same effect can be observed in roast beef flavors, but the ideal level of use is more subtle, around 20 ppm.

Fried bacon: Twenty ppm of this ingredient also works well in fried bacon flavors, although higher levels can be used in very smoky flavors.

Mushrooms: 5-Methyl-2-phenyl-2-hexenal is not really of much interest in fresh or raw mushroom flavors, but it can be very effective where the flavor reproduces the profile of dried mushrooms, especially the cep variety. Twenty ppm is a good starting point.

Boiled and mashed potatoes: The best level of this ingredient in boiled and mashed potato flavors is significantly lower than the ideal level in potato chip flavors, around 20 ppm.

Cheddar cheese: In a similar way, this ingredient is not interesting for uncooked cheddar cheese, but it can work well in toasted cheddar flavors, again at around 20 ppm.

Fruit Flavors

Prune: Prunes and other dried fruits have a hint of chocolate character, and 5-methyl-2-phenyl-2-hexenal delivers this note very effectively at levels around 500 ppm.

Raisin: Lower levels work better in raisin flavors, and 100 ppm is a good place to start.

Apricot: This ingredient is unwelcome in fresh apricot flavors, but it can be very helpful in apricot flavors that are either overtly dried or have a hint of dried apricot character. Levels of use are relatively low, around 50 ppm.

Other Flavors

Honey: Honey flavors vary dramatically in character depending on the type of honey that is the flavorist's target. This ingredient works well in many darker styles of honey flavors at levels of addition in the region of 200 ppm. It also, surprisingly, works well in lavender-style honey flavors, but the best level of use is a little lower, around 100 ppm.

Mint: Some styles of peppermint flavors can have a subtle cocoa character, and this ingredient can be a helpful contributor to that effect at around 50 ppm.

Bread: The effect of 5-methyl-2-phenyl-2-hexenal in bread flavors is to reinforce the impression of bread crust. Levels of use can vary, but around 50 ppm is ideal.

To purchase a copy of this article or others, visit www.PerfumerFlavorist.com/magazine. 