



5-Methyl-6,7-dihydro-5H-cyclopentapyrazine

Use in brown, nut, savory, cereal, vegetable, fermented and tropical flavors

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Pyrazines and similar nitrogenous chemicals fall, for the most part, into three main odor categories: roasted, peanut or popcorn. They also sometimes display a mixture of these three notes. 5-Methyl-6,7-dihydro-5H-cyclopentapyrazine (FEMA# 3306, CAS# 23747-48-0) is no exception. It combines elements of the roasted and peanut categories with an added hint of an earthy note.

This aroma combination is interesting of itself, but the chemical has a number of other useful attributes. In particular, the aroma combines unusual strength in use with relative heat stability. 5-Methyl-6,7-dihydro-5H-cyclopentapyrazine first came to the attention of flavorists as a quantitatively significant, and also extremely useful, component of roasted coffee beans, but it has a very wide range of other potential uses. In many flavors it is used in conjunction with other roasted notes, but it always has an important role.

Two other related cyclopentapyrazines also find significant, but perhaps lesser, use in flavors. 2,3-Dimethyl-6,7-dihydro-5H-cyclopentapyrazine (FEMA# 3917, CAS# 38917-63-4) is slightly weaker than 5-methyl-6,7-dihydro-5H-cyclopentapyrazine, a little less pungent, but very applicable to nut flavors. 2,5-Dimethyl-6,7-dihydro-5H-cyclopentapyrazine (FEMA# 4702, CAS# 38917-61-2) has a similar nutty character, perhaps a little more earthy, and works well in peanut flavors. 5-Ethyl-6,7-dihydro-5H-cyclopentapyrazine also has a roasted note, but is overall less interesting.

Brown Flavors

Coffee: 5-Methyl-6,7-dihydro-5H-cyclopentapyrazine is extremely useful in coffee flavors. It combines an ideal nutty roast character and good heat stability. Levels of use can vary radically; from a modest level around 100 ppm, mainly when it is used in conjunction with other roasted notes, to higher levels up to 5,000 ppm. The levels given throughout this article are the concentration of the component in a flavor that is intended for use in ready-to-drink beverages or savory applications at 0.05%.

Chocolate and cocoa: The stable, nutty character of this ingredient adds an interesting nuance to chocolate flavors, even when it is only used as a secondary roasted note. Five hundred ppm in the flavor is a good starting point.

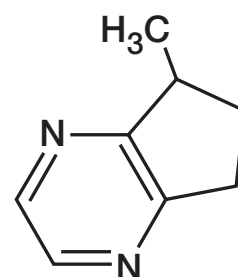
Malt: Slightly lower levels, around 300 ppm, work well in malt flavors. Malted milk flavors need even lower levels, typically around 100 ppm.

Tea: The effect in tea flavors, especially black tea flavors, can be quite subtle, and levels around 50 ppm work best. Black tea flavors benefit from this ingredient, but it is really essential in green and oolong tea flavors. In these profiles levels up to 300 ppm can be used successfully.

Nut, Seed and Cereal Flavors

Hazelnut: This cyclopentapyrazine is usually used in conjunction with other pyrazines and pyridines in hazelnut and praline flavors and adds notable realism at around 500 ppm in a flavor.

Sesame: Toasted sesame flavors can also incorporate 500 ppm or



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more of this material and work well in heated applications such as sauces.

Peanut: The slight earthy note is particularly appropriate in peanut flavors. Levels of use can vary with the degree of roast and earthy characters required, but 100 ppm is a good starting point.

Pistachio: One hundred ppm also works well in pistachio flavors, adding a subtle earthy note, making this flavor much less simplistic.

Almond: Almond flavors acquire a very attractive nutty, toasted note when levels around 100 ppm of this pyrazine are added.

Walnut: Walnut flavors can be made much more realistic and complex by the addition of around 100 ppm of 5-methyl-6,7-dihydro-5H-cyclopentapyrazine.

Barley: One hundred ppm or less is also effective in barley and many other cooked cereal flavors, adding attractive nutty and toasted notes.

Bread: The effect in bread flavors is similar, especially where a brown bread character is required. The best level of use is a perhaps little lower, around 50 ppm.

Toasted corn: The level of use in toasted corn flavors varies with the level of toasted note required, but 5 ppm is a good place to start.

Meat and Other Savory Flavors

Roast beef: 5-Methyl-6,7-dihydro-5H-cyclopentapyrazine is especially well suited for use in beef flavors, giving an attractive pan-roasted note at higher dose levels. Try initially using around 50 ppm, but consider using levels up to 500 ppm for a powerful effect.

Hydrolyzed vegetable protein: Similar levels are very helpful when recreating this difficult profile. One hundred ppm makes a good starting point.

Soy sauce: One hundred ppm also works well in dark soy sauce flavors, adding a hint of roasted character and counterbalancing the meaty notes.

Roast pork: Lower levels are better in roast pork flavors, and 20 ppm is a good starting point. Higher levels are acceptable in strongly roasted flavors.

Roast chicken: Similar levels, around 20 ppm, are useful in roast chicken flavors, but in this case higher levels are less useful, unless they are very carefully balanced.

Bacon: Typically, levels around 10 ppm work well in more meaty bacon flavors, but higher levels can work in flavors with a more burnt, fried character.



Toasted cheese: Low levels, in the region of 10 ppm, work well in cheese flavors, adding a melted or toasted note to cheddar and gruyere types of cheese.

Vegetable Flavors

Potato: This ingredient is very useful in all cooked potato flavors, but is often used at low levels, around 10 ppm. It is much more important in French fry and potato chip flavors, where it can give some aspects of the character of roasted beef fat. Higher levels can be used in these flavors, up to 300 ppm, but more typically 100 ppm.

Asparagus: Only subtle effects are acceptable in asparagus flavors, and between 5–10 ppm in a flavor are usually sufficient.

Fermented Flavors

Beer: Unsurprisingly, this ingredient is more interesting in dark beer and

stout flavors than in light beer and lager flavors. Levels can vary radically, but even 2 ppm has some effect.

Whiskey: Similarly wide-ranging levels, from 2–50 ppm, work well in these spirit flavors, particularly in the more malty style of whiskey flavors.

Tropical Flavors

Toasted coconut: Anywhere from 10 ppm up can work well, adding an attractive toasted note to coconut flavors, where it can beneficially be the dominant pyrazine.

Pandan: This pyrazine is best used as a secondary roasted note in Pandan flavors, and the level of use can vary considerably from 10 ppm to much higher levels if it is used alone.

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