



# Flavor Bites: 2-Acetyl Pyrazine

Use in brown, vegetable, tropical and other flavors

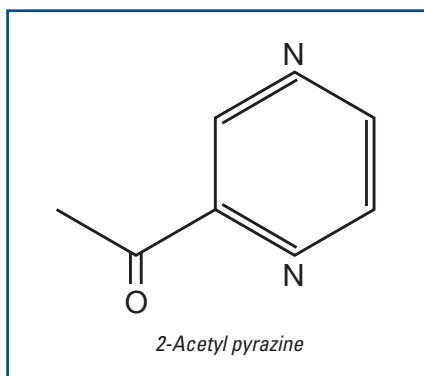
John Wright; johnwrightflavorist@gmail.com



Pyrazines have been in common use in flavors for the past 50 years, and all flavorists tend to gravitate towards their favorite members of this interesting family of chemicals. 2-Acetyl pyrazine (FEMA# 3126; CAS# 22047-25-2) is one of my overall favorite raw materials because of its unique character, power and flexibility, and the fact that it is found widely in nature.

Pyrazines, together with related chemicals such as pyridines, can be characterized by odor as predominantly roasted, peanut or popcorn. The best example of a chemical with a roasted note is trimethyl pyrazine (FEMA# 3244). 2,3-Dimethyl pyrazine (FEMA# 3271) is the best example of a chemical with a peanut character, and 2-acetyl pyridine (FEMA# 3251) is the best representative of the popcorn note. Most finished flavor categories require a combination of these three profile characters, in differing proportions. Roasted notes dominate chocolate flavors, peanut notes dominate nut flavors and, unsurprisingly, popcorn notes are dominant in popcorn flavors.

2-Acetyl pyrazine has a very attractive combination of all three notes, most notably roasted and popcorn, and for this reason it is very effective in a wide range of heated flavor profiles. Several similar chemicals are used in flavors, notably 2-acetyl-3-ethyl pyrazine (FEMA# 3250), 2-acetyl-3-methyl pyrazine (FEMA# 3964) and 2-acetyl-3,5-dimethyl pyrazine (FEMA# 3327), 2-acetyl-6-methyl pyrazine, 2-acetyl-6-ethyl pyrazine, 2-acetyl-5-methyl pyrazine and 2-acetyl-3,5,6-trimethyl pyrazine. Of these alternatives none are as ubiquitous in nature as 2-acetyl



pyrazine, but several are interesting. 2-Acetyl-3-methyl pyrazine is the next most useful member of the family and can be used in a way similar to 2-acetyl pyrazine, providing a little more heat stability at the price of reduced impact. 2-Acetyl-3-ethyl pyrazine has noticeably less impact, but it has an interesting earthy note that works well in peanut flavors.

## Brown Flavors

**Coffee:** 2-Acetyl pyrazine is a key ingredient of all good coffee flavors, but the levels of use can vary dramatically. Levels around 10 ppm in a flavor that is intended for use at 0.05% in a taster, ready-to-drink beverage or a bouillon can have a significant effect. Higher levels, even up to 1,000 ppm, are also possible, but an ideal level is, in my opinion, around 200 ppm.

**Caramel:** The roasted note is not as important in caramel and toffee flavors but, once again, 2-acetyl pyrazine is probably the best choice of all the available pyrazines; 150 ppm is a good, typical level of use.

**Chocolate:** This chemical should probably not be the dominant roasted note in cocoa and chocolate flavors, but it does provide a very attractive

secondary note when used at around 100 ppm.

**Black tea:** Black tea flavors contain a slight roasted note, which can be higher in some types (oolong) than others (Darjeeling); 10 ppm is a good starting level for a natural effect.

## Nut and Seed Flavors

**Hazelnut:** This chemical provides the perfect roasted note for hazelnut flavors. Levels of use can vary dramatically from 100 ppm to 1,000 ppm; 300 ppm is an ideal compromise for most hazelnut and praline flavors.

**Pistachio:** 2-Acetyl pyrazine is almost equally well suited to pistachio flavors and provides a unique note that is very hard to achieve with any other ingredient; 200 ppm is a good starting level, but higher quantities can be used successfully.

**Peanut:** Peanut flavors are another perfect area of use for this ingredient. Levels can vary with the degree of roasting, but 150 ppm is a good level to start with.

**Almond:** Toasted and roasted almond flavors can benefit from the addition of varying levels of this ingredient, starting at 100 ppm, but up to 1,000 ppm in highly roasted flavors.

**Sesame:** The pungent aroma of toasted sesame seeds is widely used in Asian cooking; 300 ppm of 2-acetyl pyrazine is a good starting point in toasted sesame seed flavors.

**Rice:** Cooked rice flavors can be challenging to create, but the addition of 100 ppm of 2-acetyl pyrazine can give an interesting effect.

**Barley:** Cooked notes are typically only of secondary importance in barley flavors, but can be achieved by the addition of around 50 ppm.

**Bread:** About 40 ppm of this raw material adds a crusty note to bread flavors, although, once again, levels of use can vary radically.

## Vegetable Flavors

**Toasted onion:** The attractive note of freshly cooked onions can be achieved by the addition of around 30 ppm of this ingredient to onion flavors.

**Sweet corn:** The cooked note of sweet corn flavors can be enhanced by the judicious addition of around 100 ppm of 2-acetyl pyrazine.

**Popcorn:** 2-Acetyl pyrazine is an even better fit in popcorn flavors. Levels can vary, but up to 1,000 ppm can be used without problems.

## Tropical Flavors

**Pandan:** 2-Acetyl pyrazine can easily completely dominate pandan flavors. Levels of use vary dramatically, but even levels as high as 5,000 ppm can work well.

**Guava:** Roasted notes may not immediately spring to mind as a natural aspect of guava flavors, and the effect here is necessarily subtle. Levels vary, but around 2 ppm can add an unusual effect.

**Papaya:** The same comments apply to papaya flavors, but similarly low levels, around 2 ppm can be interesting.

**Toasted coconut:** The addition of 100 ppm of 2-acetyl pyrazine is a good place to start when recreating this highly attractive flavor profile.

## Meat, Seafood and Other Savory Flavors

**Beef:** Roast beef flavors can take advantage of higher levels than boiled beef flavors; 200 ppm is a good starting point.

**Chicken:** 2-Acetyl pyrazine is useful in chicken flavors, but the optimum dose rate, around 70 ppm, is rather lower than in other profiles.

**Bacon:** Useful levels in bacon flavors range from 10 ppm to 50 ppm.

**Pork:** Pork flavors, illogically, use higher levels of this raw material than bacon flavors; 80 ppm is a good starting point.

**Liver:** Cooked liver flavors are difficult to create, and the roasted note is certainly not a key character.

Nevertheless, they can benefit from the addition of around 20 ppm.

**Clam:** Clam and many other seafood flavors require only traces of 2-acetyl pyrazine, typically around 2 ppm.

**Hydrolyzed vegetable protein:** 2-Acetyl pyrazine helps to recreate this challenging flavor type at a use level around 100 ppm.

**Cheese:** This ingredient is only suitable for cooked style cheeses such as gruyere and cheddar, providing

an interesting note at around 5 ppm. Much higher levels can be used to recreate toasted cheese flavors.

**Butter:** Similarly, 2-acetyl pyrazine can give a hint of heat treatment to butter flavors. Levels vary from 5 ppm to 50 ppm depending on the effect desired, with higher levels in melted butter flavors.

---

To purchase a copy of this article or others, visit [www.PerfumerFlavorist.com/magazine](http://www.PerfumerFlavorist.com/magazine). pf