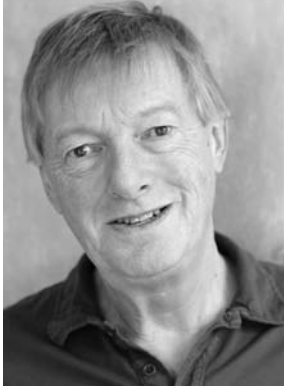
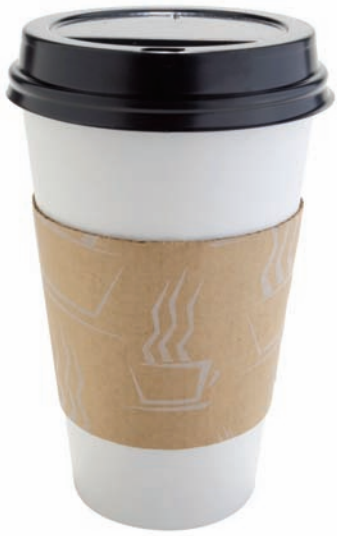


Flavor Bites: 2-Methyl 3-Tetrahydrofuranthiol

Application in meat, seafood, dairy, chocolate and coffee flavor formulations

John Wright; johnwrightflavorist@gmail.com



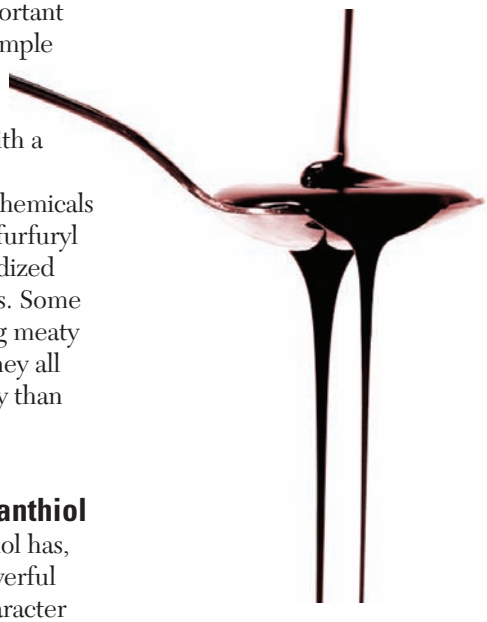
Cooked notes are generally difficult to capture, and many ingredients only work over a very small range of concentration. Add too much and it will emit a pungent smell of burnt tires; add too little and the cooked note does not just become subtle and understated, it quite simply fades away.

However, high-quality flavor ingredients can perform spectacularly even when they are grossly overdosed. In such cases, though they may not exactly end up producing a perfectly balanced flavor, the resultant flavor will be both novel and attractive. 2-Methyl 3-tetrahydrofuranthiol (FEMA# 3787, found in nature in beef) is one such ingredient.

Early Sulfur Notes

Furfuryl mercaptan (2-furan methanethiol, FEMA# 2493) was one of the earliest sulfur notes to be used in flavors to produce a cooked note. Although it had the obvious characteristics of coffee, small amounts of it could be used in meat flavors—especially chicken—to good effect. Moreover, all flavors containing furfuryl mercaptan were notorious for changing rapidly in storage—a change caused by the oxidation of furfuryl mercaptan to difufuryl disulfide (FEMA# 3257). Difurfuryl disulfide was relatively stable and had some of the pungent coffee character of furfuryl mercaptan, but with much reduced impact. However, the meaty note was enhanced, and as such difurfuryl disulfide was found to be reasonably effective, especially in chicken flavors.

Following this line of thought, chemists quickly developed a series of related furan based sulfur chemicals, with 2-methyl 3-furanthiol (FEMA# 3188) being one of the earliest and most successful. It had a strong boiled beef character and only a hint of coffee. 2-Methyl 4,5-dihydrofuran-3-thiol was similar in character, but a little less attractive, and was an important component of a widely used simple process flavor. 2,5-Dimethyl 3-furanthiol (FEMA# 3451) was also similarly beefy, but with a curious, faint woody note.



Unfortunately, all of these chemicals had the same Achilles heel as furfuryl mercaptan—they all easily oxidized to the corresponding disulfides. Some of the disulfides are interesting meaty notes in their own right, but they all have less impact and diffusivity than that of the parent thiols.

2-Methyl 3-Tetrahydrofuranthiol

2-Methyl 3-tetrahydrofuranthiol has, to a large extent, the most powerful and authentic cooked beef character of the whole series. It is also less prone to oxidation. As such, flavors containing this chemical retain virtually all of their intense impact in storage. Many meat flavors are used in conjunction with process flavors to add aroma to taste effects. 2-Methyl 3-tetrahydrofuranthiol is especially useful in this context because it brightens the rather heavy characteristics of many process flavors and adds considerably to their impact. The

only minor drawback is that in some applications it is relatively volatile. 2-Methyl 3-furyl 2-methyl 3-tetrahydrofuryl disulfide (FEMA# 4545) offers a somewhat similar boiled beef character, but with much less impact and more heat stability.

Like other ingredients, the suggested use levels are in parts per million of a flavor that is then dosed at 0.05% in a broth. A level of 1,000 ppm in the flavor would equate to a level of 0.5 ppm in a broth.

Application Areas

Meat: As expected, 2-methyl 3-tetrahydrofuranthiol performs very well in cooked beef flavors. A good, natural tasting, boiled beef effect can be achieved by using around 500 ppm in beef stock flavors. Surprisingly, roast beef flavors can accommodate a higher level of this essentially boiled beef ingredient, around 1,000 ppm, without becoming unbalanced. Clearly, use levels depend on the other ingredients present in the flavor and it is often desirable to obtain a subtle, balanced effect by using 2-methyl 3-tetrahydrofuranthiol in conjunction with other, similar sulfur chemicals, especially 2-methyl 3-furanthiol. If only 2-methyl 3-tetrahydrofuranthiol is used, it is possible to double the above-mentioned levels. The resultant flavors may be less subtle, but they are certainly distinctive. Beef flavors with higher levels of 2-methyl 3-tetrahydrofuranthiol are especially suitable for use in conjunction with process flavors.

Chicken: Chicken represents, far and away, the biggest volume of savory flavor sales. 2-Methyl 3-tetrahydrofuranthiol smells distinctly beefy, so it is not an obvious candidate to try in chicken flavors. In fact, it works surprisingly well and provides a significant proportion of the meaty character of cooked chicken. A good starting level is 200 ppm, more in dark meat and roasted flavors, less in white meat flavors.

Pork: 2-Methyl 3-tetrahydrofuranthiol can be used successfully in almost all meat flavors. In addition to beef and chicken, there is one other meat application where it excels—processed pork flavors, especially in the "chopped pork" products produced in Spain, with high use levels, around 2,000 ppm. Along similar lines, the chemical can be used successfully in pork and beef sausage flavors and seasonings, usually at a rather lower level, around 500 ppm.

Seafood: 2-Methyl 3-tetrahydrofuranthiol is also surprisingly useful in fish and seafood flavors, especially cooked shellfish. A good starting level is around 400 ppm, but much higher levels can be used in the "scampi" flavors used in snack seasonings.

Dairy: Turf and surf does not exhaust the usability of this versatile chemical; dairy flavors also present many opportunities. Many dairy flavors, particularly butter, milk and cream flavors, have a little cooked character, and 10 ppm can be added to good effect. The effect is much better than the commonly used 4-methyl 5-thiazolylethanol (FEMA# 3204), a chemical that is weak and disappointingly variable in character. Toasted cheese and condensed milk flavors have a much more pronounced cooked note and can accommodate higher levels of 2-methyl 3-tetrahydrofuranthiol, around 500 ppm.

Others: Chocolate and coffee flavors can also be improved by 2-methyl 3-tetrahydrofuranthiol, generally with lower use levels, around 100 ppm. It can be particularly helpful in recreating the special milk chocolate character obtained when dried milk crumb is used in formulating the chocolate. Along similar lines, this ingredient can also be used in traces, around 50 ppm, in nut flavors, especially roasted hazelnut flavors.

Fresh Application Areas

For an unconventional application of 2-methyl 3-tetrahydrofuranthiol, one can try using low levels, around 20 ppm, in bread, sun dried tomato, toasted sesame, coconut and cooked rice flavors. Even more unusual effects can be obtained by trying traces, around 1 ppm, in fruit flavors, particularly peach, apricot and raspberry.