



# 3-(Methylthio)propionaldehyde

This ingredient's highly pervasive aroma of cooked potatoes fits a variety of flavor profiles.

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Thankfully, a very limited number of flavor ingredients have the unfortunate property of becoming stubbornly ingrained in the clothing, skin and hair of flavorists no matter how cautiously they add them to a flavor. 3-(Methylthio)propionaldehyde, also widely known as methional (FEMA# 2747, CAS# 3268-49-3), is a prime example. It is so widely distributed in nature and so indispensable in a broad spectrum of different flavors that these odor risks are all too real for the typical flavorist working with this ingredient. 3-(Methylthio)propionaldehyde has a powerful, highly pervasive aroma of cooked potatoes. This note can be very useful, indeed, in the appropriate context and dilution of a wide range of different flavor profiles, but it can also be very irritating when it attaches itself to skin or clothing and generates a miasma of boiled potatoes that follows your every step like a faithful old dog.

The uses of this chemical are myriad and range from the more obvious vegetable and savory applications to a wide range of non-savory products, and can be especially effective at surprisingly low dose rates.

## Vegetable and Grain Flavors

**Potato:** Although 3-(methylthio)propionaldehyde is most obviously characteristic of boiled potatoes, it also works very well in flavors that are intended to reproduce every other type of potato cooking process. Dose rates can vary dramatically, but 1,000 ppm is a good place to start.

**Malt and malted milk:** One would find it to be very difficult to formulate a malt or a malted milk flavor without this ingredient. An ideal initial level in both flavor categories is 600 ppm.

**Tomato:** I know that, strictly speaking, tomatoes are fruits; however, most people instinctively lump them into the vegetable category. They are, in any case, closely related to potatoes. The ideal level of this ingredient in tomato flavors ranges from around 100 ppm up to 500 ppm or more. Higher levels are better in flavors that aim for some element of cooked character, such as tomato puree, and lower levels work better in flavors that aim to capture fresh tomatoes.

**Mushroom:** In a similar way, the ideal level in mushroom flavors depends on the type of flavor. Fresh mushroom flavors only need a touch, around 50 ppm, but dried mushroom flavors can benefit from much higher levels, nearer 500 ppm.

**Bread:** Most bread-type flavors, and especially pizza base flavors, benefit from the addition of up to 500 ppm of 3-(methylthio)propionaldehyde.

**Corn:** All the different categories of cooked corn flavors (from sweet corn to corn chips) gain realism from a moderate addition of 3-(methylthio)propionaldehyde, ideally in the region of 200 ppm.

**Toasted onion and fried garlic:** The cooked character in both alliaceous flavors is greatly enhanced and made more realistic by the addition of around 200 ppm of this chemical.

**Cucumber:** Cucumber flavors can often be very simplistic, dominated by green aldehydic notes, and 3-(methylthio)propionaldehyde plays a useful role in softening that profile and enhancing the impression of authenticity.

## Savory Flavors

**Chicken:** 3-(Methylthio)propionaldehyde is rather more reminiscent of dark chicken meat than white meat, but it is an almost essential component of most chicken flavors. The ideal level of addition depends on the profile required, but 400 ppm is a good starting point.

**Pork, ham and bacon flavors:** Almost equally high levels, around 300 ppm, work well in all types of pork flavors, from roast pork to bacon, but are particularly effective in ham flavors.

**Roast beef:** Similar levels, in the region of 300 ppm, are useful in roast beef flavors, with higher levels working well to give boiled beef notes.

**Hydrolyzed vegetable protein (HVP):** A level of 300 ppm is also a good level of this ingredient to use in HVP and similar flavors, with higher levels also giving a little more of a boiled note in this category.

**Soy sauce:** The same effect is also very evident in soy sauce flavors, but the best level of addition is slightly lower,

around 200 ppm. This aldehyde can be beneficially paired with its related alcohol in this category of flavors.

**Pâté:** Pâté flavors and other liver-derived profiles are enhanced by moderate additions of 3-(methylthio)propionaldehyde, ideally around 100 ppm.

**Seafood:** Most types of cooked seafood flavor can benefit from this raw material, but this is especially true of crab flavors. A level of 80 ppm is a good starting level in crab flavors.

## Dairy Flavors

**Cheese:** 3-(Methylthio)propionaldehyde is a vital ingredient in many different types of cheese flavors, especially those where the cheese-making process involves cooking. A level of 300 ppm works well in cheddar, Parmesan and Gruyère cheese flavors, with even higher levels being applicable if the cheese profile is toasted or grilled. Milder cheese flavors, such as cream cheese, can only accommodate much lower levels of this ingredient, around 40 ppm.

**Buttermilk:** Many dairy flavors can usefully incorporate low levels of 3-(methylthio)propionaldehyde, but buttermilk flavors are capable of accommodating higher levels, around 50 ppm.

## Brown and Nut Flavors

**Chocolate:** All the different types of chocolate flavor can make good use of 3-(methylthio)propionaldehyde at levels up to 100 ppm, but this is especially true of white chocolate flavors, where the milder overall profile makes the impact of this raw material quite noticeable.

**Peanut:** Roasted peanut flavors can also gain realism from additions of this raw material, around 100 ppm.

**Hazelnut:** Slightly lower levels are more appropriate for hazelnut flavors, ranging from 30–60 ppm.

**Tea:** Much lower levels, nearer to 20 ppm, work best in tea flavors, especially black tea flavors (although this ingredient is also useful in green tea flavors).

## Tropical and Other Fruit Flavors

**Blackcurrant:** Most blackcurrant flavors are dominated by catty sulfur notes, and this ingredient softens and modifies that profile, adding to realism at a range of levels up to 50 ppm.

**Grape:** A level of 10 ppm is more appropriate for white (and, to a lesser extent, red) grape flavors, adding authenticity.

**Mango:** 3-(Methylthio)propionaldehyde is also not the dominant sulfur note in realistic mango flavors; however, this powerful ingredient can still play a useful role, adding impact and authenticity at low levels of addition, around 5 ppm.

**Pineapple:** The same comments are equally true of pineapple flavors, and 5 ppm adds notable impact to pineapple flavors that are intended to reproduce a canned note. Much lower levels, in the region of 1 ppm, are more appropriate in fresh pineapple flavors.

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