Compounds associated with aroma in foods: Part II

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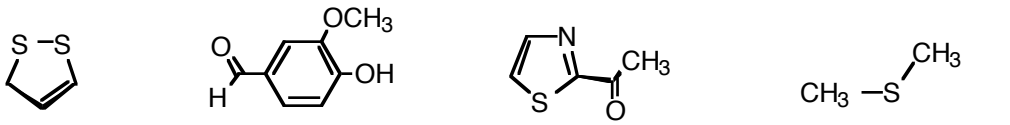
Food aromas are very complex, and literally hundreds of compounds might contribute to characteristic odors we associate with particular foods. Gas chromatography and mass spectrometry are two of the main techniques that have been used to separate and identify food aroma compounds; there is even a crude but obviously effective technique referred to as "capillary GLC sniffing" that has been used to identify characteristic odors in mixtures.

Cooked asparagus

There are over 123 volatile compounds in cooked asparagus; only two of these are present in the raw vegetable. Figure I shows the four compounds that are dominant in the aroma of cooked asparagus.

Figure I. The four compounds dominant in the aroma of cooked asparagus. (Maarse page 234)



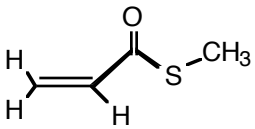
1,2-dithiacyclopentene vanillin 2-acetylthiazole dimethyl sulfide

About 40% of people who eat asparagus generate strong smelling urine shortly afterwards. In 1891 the odor was identified as methanethiol, but it is now identified as S-methyl thioacrylate and S-methyl 3-(methylthio)thiopropionate. These compounds were isolated, the structures determined, and the accuracy of the work was checked by adding them back into urine and running GC/MS analysis as well as a sniff test. The authors conclude their article:

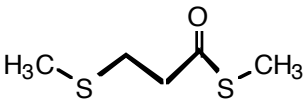
> Although S-methyl thioacrylate and S-methyl 3-(methylthio)thiopropionate have been identified as the odor-causing compounds, their metabolic origin remains an open question. (White)

However, Maarse says that some individuals lack the ability to form sulfoxides, which would prevent the formation of these compounds, but he does not reference the statement.

> **Figure II**: Two sulfur compounds responsible for the aroma of urine after asparagus consumption (White)



S-methyl thioacrylate



S-methyl 3-(methylthio)thiopropionate

References:

Henk Maarse, ed., Volatile Compounds in Foods and Beverages, Dekker (New York) 1991.
Robert White "Occurrence of S-Methyl Esters in Urines of Humans After They Have Eaten Asparagus" *Science* **1971** 189, 810.

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