

Deodorization of Garlic Breath by Foods, and the Role of Polyphenol Oxidase and Phenolic Compounds.

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Abstract

Garlic causes a strong garlic breath that may persist for almost a day. Therefore, it is important to study deodorization techniques for garlic breath. The volatiles responsible for garlic breath include diallyl disulfide, allyl mercaptan, allyl methyl disulfide, and allyl methyl sulfide. After eating garlic, water (control), raw, juiced or heated apple, raw or heated lettuce, raw or juiced mint leaves, or green tea were consumed immediately. The levels of the garlic volatiles on the breath were analyzed from 1 to 60 min by selected ion flow tube mass spectrometry (SIFT-MS). Garlic was also blended with water (control), polyphenol oxidase (PPO), rosmarinic acid, quercetin or catechin, and the volatiles in the headspace analyzed from 3 to 40 min by SIFT-MS. Raw apple, raw lettuce, and mint leaves significantly decreased all of the garlic breath volatiles in vivo. The proposed mechanism is enzymatic deodorization where volatiles react with phenolic compounds. Apple juice and mint juice also had a deodorizing effect on most of the garlic volatiles but were generally not as effective as the raw food, probably because the juice had enzymatic activity but the phenolic compounds had already polymerized. Both heated apple and heated lettuce produced a significant reduction of diallyl disulfide and allyl mercaptan. The presence of phenolic compounds that react with the volatile compounds even in the absence of enzymes is the most likely mechanism. Green tea had no deodorizing effect on the garlic volatile compounds. Rosmarinic acid, catechin, quercetin, and PPO significantly decreased all garlic breath volatiles in vitro. Rosmarinic acid was the most effective at deodorization.

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Effect of milk on the deodorization of malodorous breath after garlic ingestion.

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Abstract

The effect of milk and milk components on the deodorization of diallyl disulfide (DADS), allyl methyl disulfide (AMDS), allyl mercaptan (AM), allyl methyl sulfide (AMS), and methyl mercaptan (MM) in the headspace of garlic as well as in the mouth- and nose-space after garlic ingestion was investigated using selected ion flow tube-mass spectrometry (SIFT-MS). Fat-free and whole milk significantly reduced the head-, mouth-, and nose-space concentrations of all volatiles. Water was the major component in milk responsible for the deodorization of volatiles. Due to its higher fat content, whole milk was more effective than fat-free milk in the deodorization of the more hydrophobic volatiles diallyl disulfide and allyl methyl disulfide. Milk was more effective than water and 10% sodium caseinate in the deodorization of allyl methyl sulfide, a persistent garlic odor, in the mouth after garlic ingestion. Addition of milk to garlic before ingestion had a higher deodorizing effect on the volatiles in the mouth than drinking milk after consuming garlic. Practical Application: Ingesting beverages or foods with high water and/or fat content such as milk may help reduce the malodorous odor in breath after garlic ingestion and mask the garlic flavor during eating. To enhance the deodorizing effect, deodorant foods should be mixed with garlic before ingestion.