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Research News

Headline

New research shows antioxidants can hinder acrylamide formation.

Title

The Effect of Antioxidants on Elimination and Formation of Acrylamide in Model Reaction Systems

Descriptor

A recent article published in the *Journal of Hazardous Materials* has found a connection between antioxidants and their ability to inhibit acrylamide formation.

Summary

The article reports that antioxidants could effectively destruct or inhibit the formation of acrylamide. Acrylamide was first detected in 2002 by Swedish researchers in commonly consumed baked and fried foods. Scientists have been studying its formation to determine if it poses risk to human health.

Researchers investigated the effects of several antioxidants and their oxidation products on both preventing the formation of acrylamide and on the elimination of acrylamide. They created the antioxidants in a lab and added extracts to test tubes of oil that were heated and then cooled.

The researchers found that more acrylamide was destructed if the antioxidants were less stable. Antioxidants would destruct acrylamide content in two ways: attacking the alkene bond of acrylamide by formation of free radicals and also by directly reacting with acrylamide.

Certain antioxidants added to an acrylamide solution led to destruction of acrylamide with less stable antioxidants resulting in a greater impact. The products of that process were found to directly destruct acrylamide and its precursors, thus inhibiting acrylamide formation. Stable antioxidants could not effectively destruct or inhibit the formation of acrylamide.

Their results explain why different antioxidants show different effects on inhibiting acrylamide formation. Researchers also found a positive correlation between the carbonyl value and acrylamide formation. This suggests that antioxidants can inhibit acrylamide formation by inhibiting oil carbonyl compounds formation.

Antioxidants were found to inhibit acrylamide formation three ways:

1. Destruct the formed acrylamide through their oxidized products.
2. Form carbonyl compounds such as vitamin C, which reacts with the main precursor of acrylamide.
3. Inhibit production of carbonyl compounds produced from frying oil.

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Citation

Ou S, Shi J, Huang C, Zhang G, Teng, J, Jiang Y, and Yang B. Effect of antioxidants on elimination and formation of acrylamide in model reaction systems. Journal of Hazardous Materials. 2182 (2010) 863-868.