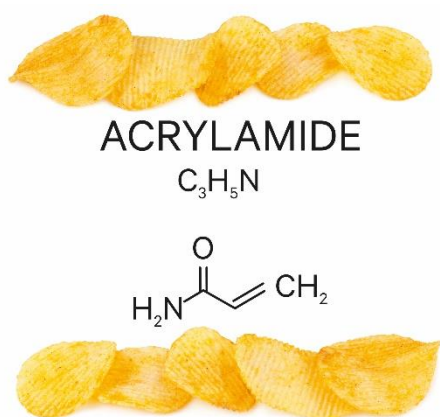


The Secret to perfect frying: quality oil and potatoes to prevent acrylamide

The role of sugars in potatoes in acrylamide formation during the frying process.

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Industrial frying of potato chips is a beloved process worldwide that creates a crispy and delicious snack. However, in addition to providing undisputed goodness, this process can pose a risk to human health in the form of acrylamide, a carcinogenic chemical formed during cooking at high temperatures. To ensure the food safety and quality of potato chips, it is essential to carefully evaluate both the oil used and the potatoes themselves.



The Formation of Acrylamide

Acrylamide is a chemical that forms naturally during high-temperature cooking of foods containing starch, sugars and amino acids, such as potatoes. This chemical process occurs during the Maillard reaction, which gives the characteristic golden color and flavor to potato chips. It is formed mostly from sugars (glucose and fructose) and amino acids (mainly an amino acid called asparagine) naturally present in many foods. The presence of acrylamide has been found in products such as potato chips, French fries, bread, cookies, and coffee.

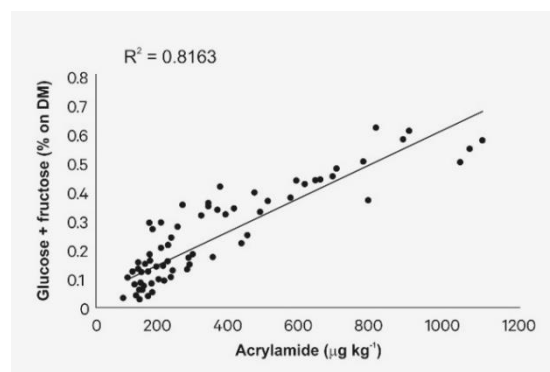
The Quality of Oil

A key step in producing high-quality potato chips is the use of good-quality frying oil. The oil should be chosen carefully, taking into account its thermal stability and smoke point. An oil with a high smoke point will withstand high temperatures better without degrading.

In addition, it is critical to regularly monitor the quality of the oil during the frying process. Oil temperature, soaking time, and the amount of oil used affect the final result. Analysis of acidity, peroxides, and p-anisidine allows you to keep an eye on the state of oxidation and decide how to manage the system. Used oils should be filtered and changed periodically to prevent them from degrading and producing unwanted substances.

The Quality of Potatoes

The various existing potato cultivars contain the main precursors of acrylamide (amino acids and reducing sugars) and are therefore predisposed to its formation during cooking. The vulnerability of potatoes to acrylamide formation is explained by the abundant presence of free asparagine, an amino acid that is proportionally much more abundant in the tuber than the reducing sugars. This means that although both compounds are involved in the formation of acrylamide, the amount of reducing sugars acts as a decisive factor in acrylamide production because the glucose and fructose values present in the tuber can be very different among different cultivars. A direct and significant link between the level of acrylamide generated and the amount of these sugars has been observed through various research. Ideally, potatoes intended for frying should have a concentration of reducing sugars of less than 0.5 percent by dry weight.



Acrylamide concentration as a function of the reducing sugar content in the potato tuber.

Analysis of glucose and fructose is therefore a key check to be made on the incoming raw material and also during storage, as these sugars also tend to increase rapidly depending on storage conditions. In addition to acrylamide formation, a high sugar content in potatoes can also lead to excessive coloration during frying and an altered taste.

CDR FoodLab®

With the CDR FoodLab® analysis system, it is possible to **determine the level of sugars (glucose and fructose) in potatoes** after briefly processing the sample.

CDR FoodLab® itself is widely used by manufacturers of snacks and potato chips to monitor the quality of frying oil through the determination of Free Fatty Acids, Peroxide Value and p-Anisidine Value.



Here is a short list of the CDR FoodLab® system advantages:

- Analyses are very quick and rely on an analysis method that is reference method compliant
- Analysis can be performed any time inside the plant, in large quantities
- CDR FoodLab® allow time saving and drastic cutback of analysis costs
- The simplicity and rapidity of the analysis method allow everyone to perform the tests with the analyzer
- CDR FoodLab® uses prefilled cuvettes and reagents that does not require an equipped chemical laboratory

References:

De Wilde T. et al. "Selection Criteria for Potato Tubers To Minimize Acrylamide Formation during Frying." Journal of Agricultural and Food Chemistry - April 2006

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