Quality Standards

Total Polar compounds in frying oil

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Oils and fats represent one of the three major classes of food constituents together with carbohydrates and proteins. Deep-fat frying is one of the most popular cooking procedures and leads to the production of both desirable and undesirable compounds. The cooking process affects the physicochemical characteristics and quality of the frying medium and the fried product itself.

The quality of oils and fats during the frying process has a major influence on the quality of the final product. Thermal processing of frying oils leads to oxidative and hydrolytic reactions i.e. hydrolysis and polymerisation and these chemical and physical changes lead to the formation of many volatile and non-volatile decomposition products. The majority of the non-volatile compounds formed during frying are, for convenience, classified as Total Polar compounds (TPC) and the formation of such compounds during repeated frying has been shown to increase with the degree of oil unsaturation.

The determination of the percentage of Total Polar compounds (% TPC) is one of the most reliable methods for monitoring the quality changes in oils during the frying process and it reflects the degradation of the oil after repeated use. In order to protect consumers, several countries and International bodies have issued recommendations or a regulation which set maximum limits for the percentage of TPC, and regulates the use of oils and fats subjected to frying. Countries that control the quality of frying oil include:

Country	Legislation/ Recommendation	Limits (% TPC)
France	Legislation	25
Germany	Recommendations by the German Society for Fat Science (DGF)	24
Italy	Legislation	25
Poland	Legislation	25
Spain	Legislation	25
Brazil	Recommendation	25
South Africa	Regulation	25

In light of the increasing concern, LGC Standards has included a new sample, Total Polar compounds in frying oil to the food chemistry proficiency testing scheme (QFCS). Palm oil was chosen as a material for this proficiency testing (PT) trial sample. It is extensively used in commercial frying and in the wider food industry and has a fatty acid composition of 50% saturated and 50% unsaturated fat. It is therefore relatively stable to oxidation and is naturally semi solid at room temperature, so does not require hydrogenation to become solid.

References are available from the author on request

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First published in International Food & Meat Topics volume 28.1

Quality Standards

New strict codes of practice for acrylamide

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In September 2016, the EU Commission presented an amended regulation proposal for acrylamide, based on feedback from the stakeholders' consultation. The Regulation is proposed under Article 4 of Regulation (EC) No. 852/2004 on the hygiene of foodstuffs, and it sets out a requirement for food business operators to take account of strict new codes of practice for reducing acrylamide formation, as part of their food safety management systems.

The EU Commission has recommended that member states should continue the collection of acrylamide monitoring data and, as with previous surveys, send the data to the European Food Safety Authority (EFSA). Given the increased spotlight on acrylamide in both the EU and globally, it is certain that regulatory authorities will continue to monitor acrylamide levels in food, to determine whether further action/regulation is needed.

Acrylamide is a process contaminant, formed in numerous baked or fried carbohydrate-rich foods as a result of high temperature cooking at >120˚C (248˚F). It is formed from reducing sugars and the amino acid asparagine (a building block of proteins) as part of the Malliard reaction.

The vast majority of evidence from animal studies suggests that acrylamide and its metabolite glycidamide are genotoxic and carcinogenic i.e. they have the potential to damage DNA and cause cancer. However, the majority of human studies have not yet shown direct correlation with cancer therefore it is classified as a possible carcinogen in Group 2A by the International Agency for Research on Cancer (IARC).

The intake of large amounts of acrylamide may also cause neurotoxic and hormonal disorders. Based on the results of monitoring in the Member States from 2007-2011, the EU Commission has set 'indicative values' for acrylamide in various food products. The most recent indicative values are laid down in Commission Recommendation (EC) No. 647/2013. In June 2015, EFSA published its first full risk assessment of acrylamide in food. The report reconfirmed previous evaluations, that acrylamide in food can potentially increase the risk of developing cancer for consumers in all age groups.

In light of the increasing concern, and the potential for higher demand for acrylamide analysis, LGC Standards have included a new sample, for the analysis of acrylamide in snacks, to the food chemistry proficiency testing scheme (QFCS).

References are available from the author on request

First published in International Food & Meat Topics volume 28.3