TECHNICAL REGULATORY DEVELOPMENTS: ACRYLAMIDE, 3-MCPD, 2-MCPD AND GLYCIDYL FATTY ACID ESTERS AS WELL AS FURAN - AN INDUSTRY PERSPECTIVE

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Food processing, in particular thermally driven processes, induce chemical changes to food materials that may lead to the adventitious formation of certain compounds, so-called process contaminants, which in some cases could be harmful to human health.

These contaminants– such as acrylamide or furan – are often formed together with flavour substances which are of the great importance for food quality and food taste, or – as in the case of chloroesters and glycidyl esters - are generated during the refining process of food raw materials such as vegetable oils. In practice, it is difficult to completely avoid the formation of heat-induced contaminants while at the same time still ensuring the product properties in such a way so that the food continues to meet quality and safety requirements.

Intensive scientific studies on these compounds have been conducted over the past decades by researchers in academia and the food industry. Increasing insight in understanding the presence, formation, and potential risks to public health posed by the compounds formed during food processing has been gained and where possible mitigation strategies have been developed.

This contribution will focus on technical and regulatory developments, as well as possible mitigation strategies to lower their occurrence in food (i.e. acrylamide, furan, 3-MCPD, 2-MCPD and glycidyl fatty acid esters).

Acrylamide

Since acrylamide was first identified in food in 2002, the food industry has been committed to mitigating acrylamide formation. In its 2015 opinion, the European Food Safety Authority (EFSA) acknowledged that FoodDrinkEurope's 'acrylamide toolbox', which is also supported by the Commission and Member States, is an important initiative to reduce acrylamide across the relevant food categories. FoodDrinkEurope coordinates the efforts of individual food manufacturers and their associations.

Despite all these efforts, several food business operators (FBOs) have not yet fully embraced the tools stipulated in the Toolbox, and progress in the implementation of the tools can be significantly improved. Therefore, FoodDrinkEurope welcomes the European Commission's draft Regulation, which introduces mandatory measures for consumer protection and will result in the further progressive reduction of acrylamide in the European food supply.

The Commission proposes to implement the ALARA principle, to be met through the implementation by food business operators of process controls and other measures established in sector-specific Codes of Practice. The implementation of the Codes of Practice will be enforced and monitored by competent national authorities. Benchmark values for acrylamide in different food categories will be included in the Regulation.

3-MCPD, 2-MCPD and glycidyl fatty acid esters

Fatty acid esters of monochloropropanols (termed MCPD esters or 'bound' MCPD) have been identified in a wide range of processed foods. Most of the bound MCPD in the human diet stems from refined vegetable oils. MCPD esters, that include the isomers 3-MCPD and 2-MCPD, and glycidyl esters are two independent classes of process contaminants known to form during the refining of fats and oils. Most of the focus of research so far has been on 3-MCPD esters, and only very little data are available on the levels of 2-MCPD esters in foods. The food industry has conducted extensive research into the formation of MCPD esters and glycidyl esters. Based on this research, the oil and fat manufacturers have developed a catalogue of mitigation strategies, that

are being applied to lower the levels of MCPD esters and glycidyl esters to as low as reasonably achievable, whilst maintaining the safety and important organoleptic properties of fats and oils.

Health Authorities have expressed concerns about possible health risks linked to the intake of 3-MCPD esters and glycidyl esters. The European Food Safety Authority (EFSA) issued its latest opinion on the presence of process contaminants in vegetable oils and foods in May 2016. EFSA concludes that potential health concerns for consumers exist for certain processed foods such as vegetable oils and margarines, and for infants consuming infant formula which contain palm oils and other vegetable derived fats.

A draft regulation is now on the table which focuses on measures related to baby and infant food as well as vegetable oils.

FoodDrinkEurope will not develop a toolbox for the mitigation of these substances in processed food, since its formation during food processing has not been confirmed for most foods. FoodDRinkEurope does, however, endorse the toolbox developed by its member BLL, the German Bund für Lebensmittelrecht and Lebensmittelkunde. This toolbox was developed by a group of representatives from the German food industry sector, research institutes and private laboratories under coordination of the BLL. It contains tested "tools" across the entire food chain. It will enable the individual user to profit from the knowledge and experience available in research and practice in order to reduce the levels of 3-MCPD esters and Glycidyl esters accordingly.

Furan

The chemical furan is present in a variety of cooked and/or heat processed foods, including canned and jarred foods (soups, sauces, gravies, pasta) as well as baby food in jars, baked bread, breakfast cereals and coffee. First detected in the 1960s, furan is likely to have been part of the human diet for thousands of years, as it can be formed through traditional cooking methods. In high doses, it can cause cancer in animals and could be a potential carcinogen to humans. The European Commission (EC) has asked the European Food Safety Agency (EFSA) to provide a scientific opinion on the health risks associated with furan and the more recently the closely related alkylfurans 2- and 3-methylfuran (2-MeF and 3-MeF) in food. This opinion is expected by end 2017.

The food industry has conducted intensive research on the analysis, chemical formation and possible mitigation of furan in foods. The overall approach is to apply the ALARA concept, which essentially means that FBOs should take every reasonable measure to reduce the presence of furan in the final product, taking into consideration Quality and other Food Safety requirements. However, it is important to remember that interventions or changes to thermal processing steps cannot be done without thorough analysis, as lowering thermal treatment may have serious microbiological effects and possibly result in an unsafe product. FoodDrinkEurope is working on the preparation of a furan "Toolbox", analogous to the well know "acrylamide toolbox".

The FoodDrinkEurope furan "Toolbox" would provide possible avenues of mitigation of furan for Food Business Operators, being aware that most of the measures at this stage are based mainly on laboratory or pilot scale trials.

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