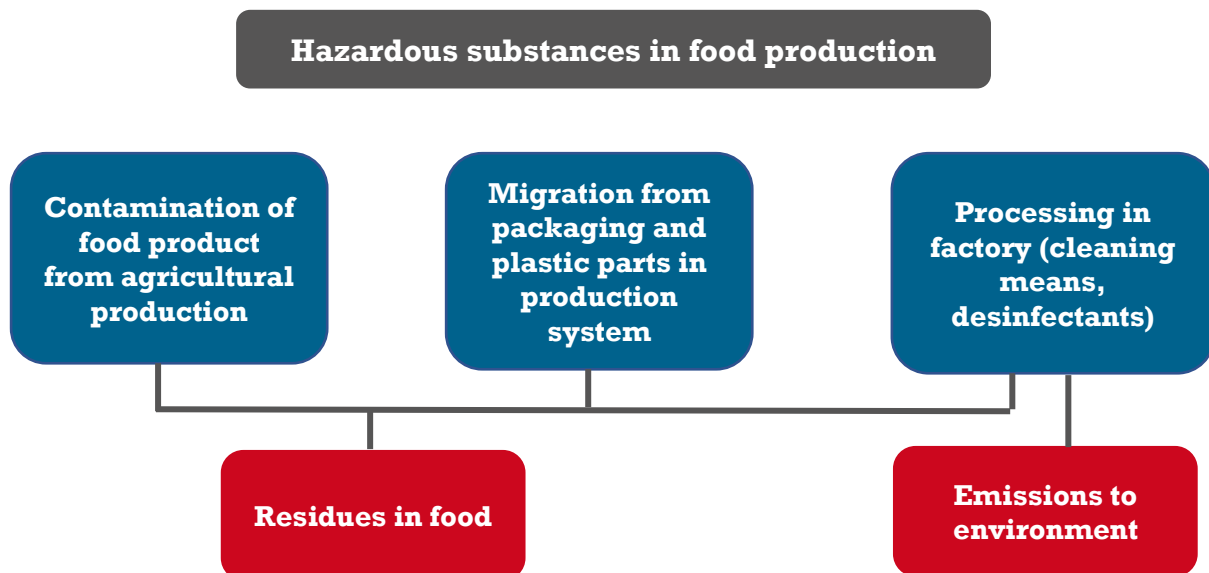


Hazardous substances in food processing

Introduction

When talking about chemicals and hazardous substances management, food industry is not necessarily the first one that comes in mind; however, hazardous substances are prevalent also here. There are several sources of hazardous substances in food production and food products. In this article you can find the outline of the problem and get some advices to reduce the use of undesired chemicals.

The main sources of undesired hazardous substances in food production are migration from packaging and plastic parts in production system, substances coming from cleaning agents and disinfectants used in factory and contamination of food products from agricultural production.



1. Migration from packaging and plastic parts in production system

Certain hazardous substances can migrate into food from food packaging, as well as from plastic parts of processing lines. The migration into food from food contact materials is regulated by the Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food requiring that *“any material or article intended to come into contact directly or indirectly with food must be sufficiently inert to preclude substances from being transferred to food in quantities large enough to endanger human health.”* In order to achieve this, Regulation (EC) No 1935/2004 sets maximum migration levels of certain substances from such materials into food, and it has to be approved by testing.

The food producer receives from suppliers of packaging the food contact materials declaration of compliance which containing information about the migration limits.

LIFE / FIT FOR REACH

However, there are some substances that are thought to have no safe limits, therefore the safety of the current norms are questioned e.g. in the case of bisphenol A, DEHP (bis (2-ethylhexyl)phthalate). These compounds are endocrine disruptors.

The German Federal Institute for Risk Assessment informs “*adolescents and adults ingest DEHP mainly via their food*”, however, concludes that “the intake quantity for the vast majority of consumers is usually so small, however, that no health risk exists” [1]

Nevertheless, the DEHP is a substance of very high concern, it is restricted by REACH requiring authorisation for its use, however, it is still allowed to be used as “*plasticiser in repeated use materials and articles contacting non-fatty foods*”.

In order to avoid contamination of the food with these substances, you can avoid use of such food containing materials and also, if using of recycled packaging carefully test it for DEHP content since, a recycled packaging material might contain also unexpected hazardous substances coming from the recycled material, for example, DEHP has been found in recycled PET bottles [2].

Bisphenol A is currently allowed to be used as coating in food packaging materials and its residues might also remain in the polycarbonate packaging. Recently bisphenol A was included in REACH Candidate List for Authorisation. Currently, a proposal has been made to lower the migration limit of BPA from food contact materials and it might be that in the future a ban will be prepared for such uses. You can avoid polycarbonate materials and also such type of packaging requiring coatings containing bisphenol A. However, this is not easy task since some substitutes of bisphenol A might have similar hazard profile (like bisphenol S) [3].

With regard to some food contact materials (cardboard, printing inks) the rules in the EU are not harmonised, and, depending on the Member State, legislative requirements might be insufficient. This situation is currently assessed and a new legislative proposal can be expected [4].

In order to minimise hazardous substances in food due to migration carefully test the packaging from recycled material and you should always receive a declaration of compliance from your supplier. More information about restrictions on substances contained in food contact materials you can find in the European Data base on Food Contact Materials [5]

2. Cleaning agents and disinfectants used in factory

In food production the producer has to guarantee cleanliness to avoid microbiological hazards and prolong shelf life of the products. Thus, processing in factory requires applying cleaning means and disinfectants, but these products could have associated risks and may contain hazardous substances. The cleanliness depends on several factors: type of cleaning means used, mechanical methods, surface properties, temperature and application time. Thus, in order to reduce amount of hazardous substances, a cleaning processes can be optimised by modifying these factors.

A precondition for assessing chemical hazards in any production is obtaining good quality safety sheets (SDS) of used substances/products and evaluating them.

LIFE / FIT FOR REACH

Case. A food company from Baltic States used a professional-cleaning mean. They participated in the LIFE project “Fit for REACH” and asked the expert to evaluate the hazardous substances in the cleaning agent. It turned out that cleaning agent contained more than 20% trisodium nitrilotriacetate, which is suspected of causing cancer. Use of such cleaner requires wearing protective gloves, protective clothing and eye or face protection. The company decided to find another cleaning mean.

Therefore a producer shall study safety data sheets of cleaning agents and disinfectants, and other chemicals. In case there are substances with hazard statements listed in table below, substitution is to consider. More information one can find <http://fitreach.eu/content/substitution>.

Very important to substitute	Substitution should be considered
H300, 310, 311, 314, 330, 340, 350, 360, 361, 362, 370, 372, 400, 410, EUH032	H301, 302, 304, 312, 314, 315, 317, 318, 319, 331, 332, 334, 341, 351, 371, 373, 411, EUH029, EUH031

A good practice is to ask safety data sheets and material declaration from potential supplier already prior to purchase of the chemical or material. Although legislation does not oblige to provide an SDS prior to purchase, a good, supportive supplier will provide a potential client with this information.

3. Contamination of food product from agricultural production

Contamination of food product from agricultural production and farming includes mainly residues of pesticides (plant protection products) and pharmaceuticals. Plant protection product area is strongly regulated by the legislation. According to monitoring report from European Food Safety Authority [6] 44% of the food samples analysed contained quantified residues of plant protection products, but only in 3 % legal limits (maximum residue levels) were exceeded. In comparison, in 13.5% of samples of organic products pesticide residues were detected, and only in 0.7% legal limits were exceeded. According to this report, the pesticide residues in the organic products do not necessarily come from organic production, but may come from other sources e.g. environmental pollution. In order to reduce occurrence of pesticide residues in food, you can choose organic production or set particular requirements for your suppliers.

It is also worth noting that some pesticides are considered potentially endocrine disrupting and knowing, which agricultural products may contain them may help to choose safer goods. More information in the link below: [http://www.edc-eu-tour.info/sites/edc-eu-tour.info/files/field/document file/report ed pesticides in eu food pan europe.pdf](http://www.edc-eu-tour.info/sites/edc-eu-tour.info/files/field/document%20file/report%20ed%20pesticides%20in%20eu%20food%20pan%20europe.pdf)

LIFE / FIT FOR REACH

Case. A client of some Latvian grain producers demands no pre-harvest use of glyphosate. Glyphosate is the most frequently used herbicide both worldwide and in the EU and it has been used for several decades. According to the harmonised classification and labelling approved by the

European Union, this substance is toxic to aquatic life with long lasting effects and causes serious eye damage. In 2017 there was a European Citizens' Initiative "Ban Glyphosate and Protect People and the Environment from Toxic Pesticides", where a total of 1,070,865 statements of support from 22 Member States had been checked and validated by national authorities. Even though the Commission considered that there was neither scientific nor legal grounds to justify a ban of glyphosate, such initiative clearly shows common interest and doubts related to use of pesticides.

More detailed explanation about Commission's decision can be found - https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_glyphosate_eci_final.pdf

Summary

To conclude, a precondition for less hazardous substances in food production starts with receiving documentation about properties on incoming raw materials from your suppliers and having basic knowledge how to interpret it. Nonetheless, it is also important to have a general understanding about hazardous substances, how to identify them and how to avoid them.

LIFE / FIT FOR REACH

References

[1] - Plasticiser DEHP is ingested mainly through food, 2013, the German Federal Institute for Risk Assessment,
http://www.bfr.bund.de/en/press_information/2013/13/plasticiser_dehp_is_ingested_mainly_through_food-186815.html

[2] Recycled PET a source of DEHP, 2013,
<http://www.foodpackagingforum.org/news/new-study-recycled-pet-a-source-of-dehp>

[3] Bisphenol A, <https://echa.europa.eu/chemicals-in-our-life/hot-topics/bisphenol-a>

[4] Mapping the industry and regulatory frameworks for food contact materials to support better regulation, <https://ec.europa.eu/jrc/en/science-update/mapping-industry-and-regulatory-frameworks-food-contact-materials-support-better-regulation>

[5] - Data base on Food Contact Materials
(https://webgate.ec.europa.eu/foods_system/main/?event=display).

[6] EFSA (European Food Safety Authority), 2017. The 2015 European Union report on pesticide residues in food. EFSA Journal 2017;15(4):4791, 134 pp.
doi: 10.2903/j.efsa.2017.4791



The project “Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency” (LIFE Fit for REACH, No. LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.