2016 Conference: Lipids, Nutraceuticals and Healthy Diets throughout the Life Cycle. The Oils & Fats Specialist Group of the New Zealand Institute of Chemistry, 08.-10.11.2016, Nelson, South Island, New Zealand

How is it possible to reduce the formation of 3-MCPD and glycidyl ester during oil processing? – Some suggestions.

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In May 2016, about 10 years after the first announcement of 3-monochloropropane-1,2-diol (3-MCPD) and glycidyl fatty acid esters in several edible oils, the CONTAM panel of the European Food Safety Authority (EFSA) defined a new tolerable daily intake of 0.8 µg 3-MCPD/kg bw.. Additionally they stated a potential health risk for average consumers of glycerol-based process contaminants found in palm oil, but also in other vegetable oils, margarines and some processed foods in all young age groups, and for high consumers in all age groups. Thus, consumer groups and food safety organizations force food processors to lower 3-MCPD and glycidyl ester contents in edible oils but also other food products especially infant food. Limits of 2 mg/kg 3-MCPD ester, 0.5 mg/kg 2-MCPD ester and 1 mg glycidyl ester are under discussion.

The presentation gives an overview about the most promising possibilities to reduce the amount of 3-MCPD and glycidyl esters in edible fats and oils during the refining process. On the different stages of oil processing it is possible to (1) reduce or avoid precursors in the raw material before processing and to select suitable raw materials for oils and fats, respectively, (2) to change the conditions of the refining process and to introduce new steps of refining and (3) to reduce the amount of the esters by suitable absorbent materials after refining. Examples are the optimization of palm fruit growing, harvest and pre-processing in the oil mill and selection of crude oil with low contents of precursors, the introduction of an additional washing step before refining to remove chloride compounds or the reduction of the temperature load during deodorization, e.g. by dual deodorization with different temperature profiles or short-path distillation.

Some of these possibilities are already introduced into oil processing and with the available means it is possible to reduce the content of 3-MCPD and glycidyl esters significantly in fats and oils, especially for risk products, but the problem is that the implementation of measures costs money.

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