



GLOBAL ORGANIZATION FOR EPA AND DHA OMEGA-3S

Global Organization for EPA and DHA Omega-3s (GOED) - Provision of Information on the Mitigation Approaches used by Fish Oil Refiners.

Name of Submitter: Global Organization for EPA and DHA Omega-3s (GOED)

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Dear chair and co-chairs of the Electronic Working Group,

Please find below the answers to the Chair's specific additional questions raised about refined fish oils in the second draft Code of Practice for the reduction of 3-monochloropropane-1,2- diol esters (3-MCPDe) and glycidyl esters (GE) in refined oils and food products made with refined oils (at step 5). We have requested information from our member companies (manufacturers of refined fish oils and related omega-3 oils), and limited, but hopefully useful answers are provided below. Please consider the answers in conjunction with our previous reports submitted on September 28th and November 30th, 2018, containing specific examples of mitigation approaches practiced by fish oil producers currently and additional requested information.

As mentioned previously, GOED represents over 200 companies globally active in the omega-3 business, and among its members (<http://www.goedomega3.com/index.php/our-members/list-of-goed-members>) are the majority of the producers of refined oils rich in EPA and DHA omega-3 fatty acids, including fish oils, other marine oils, algae oils and terrestrial oils. In addition, our membership includes the largest finished product manufacturers utilizing refined omega-3 oils globally.

Answers to the questions relevant to refined fish oils:

Item 33.

Question: *Is this applicable to fish oils?:* "Lowering the degumming temperature may help to reduce formation of 3-MCPDE precursors; however, the degumming temperature will depend on numerous factors including type of oil."



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Answer: We have no information that refined fish oil producers (currently) specifically employ the lowering of degumming temperature to reduce 3-MCPDe or GEs.

Item 34.

Question: *Is this applicable to fish oils?:*" Using chemical refining (i.e., neutralization) in place of physical refining can help remove precursors (e.g. chloride) and reduce FFAs, which may allow for lower deodorization temperatures. However, chemical refining can lead to excessive oil loss and may have a greater environmental impact than physical refining "

Answer: Chemical neutralization is still the usual standard process in fish oil refining. Physical refining is possible, but not as commonly used. This statement is still correct. Some equipment producers for fish oil refining (not for concentrates) have engineering solutions that only have a deodorization column for the reduction of acid value as well as for sensory improvement. For such processing lines this comment is applicable.

Item 37.

Question: *Is it appropriate to state that reduced time of deodorization will decrease the formation of glycidyl-esters in fish oils? (see in the context of this sentence):* "Consider conducting deodorization of vegetable oils and fish oils at reduced temperatures or for reduced time to decrease formation of GE. For example, it has been suggested to conduct deodorization at 190-230°C for vegetable oils and less than 190°C for fish oils, although temperature will vary depending on residence time of oil. "

Answer: This is correct, fully supported based on general knowledge on processing.

Item 40.

Question: "Short-path distillation (in place of deodorization) has been shown to reduce the thermal load and formation of esters in fish oil, contributing to lower amounts of 3-MCPDE and GE in comparison to conventional deodorization. However, additional post processing using mild deodorization (i.e., 160-180°C) is needed to address sensory considerations."

Answer: One additional major fish oil refiner in Germany indicates that this is correct based on general considerations, since short-path distillation uses a better vacuum system and therefore can work with lower temperatures.

Item 45.

Question: "Treatment of refined MCT (medium-chain triacylglycerols) oil with one or more bases (including carbonate, bicarbonate, hydroxide, oxide, alkoxide, amine bases, hydrides, and phosphines) converts 3-MCPDE and GE to TAGs "

Answer: At present we have no additional information available on the use of this approach beyond MCT oils (experimental or industrial).

Item 46.



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Question: " SELECTION AND USES OF REFINED OILS IN FOOD PRODUCTS MADE FROM THESE OILS

Oil selection

Selecting refined vegetable oils with low levels of 3-MCPDE and GE. " - *Are fish oils used in food products at levels that justify this addition?*

Answer: GOED's estimations for the global utilization of refined fish oils (including algae oils and EPA/DHA concentrates) in the year 2017 are:

Dietary/Food supplements; 70,300 metric tons (mT)

Infant formula; 4650 mT

Clinical Nutrition/Medical Foods: 1400 mT

Functional Foods; 4400 mT.

Selecting refined fish oils (EPA&DHA omega-3 oils) with low levels of 3-MCPDE and GE is certainly a valuable mitigation strategy to explore for producers and finished product manufacturers that utilize such oils. In fact, this is already occurring in the infant formula sector (for the selection of DHA-enriched oils).

Last suggestion:

Based on input from our members, GOED would like to make the following suggestion on this last draft version:

1. In the **Introduction, Item 2** – add the wording “dietary/food supplements” as a food product category containing refined oils: “Exposure to 3-MCPDE and GE can occur through consumption of refined oils and food products containing refined oils, including infant formula, dietary/food supplements, fried potato products, and fine bakery wares.

Sincerely,

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