

PROCESS FOR REMOVING UNWANTED PROPANOL COMPONENTS FROM UNUSED TRIGLYCERIDE OIL

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TECHNICAL FIELD OF THE INVENTION

The present invention relates to a process for removing unwanted propanol components from unused triglyceride oil, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof. The present method comprises the steps of contacting a triglyceride oil that is contaminated with the aforementioned unwanted propanol components with an adsorbent, followed by the recovery of a decontaminated triglyceride oil having a reduced concentration of the unwanted propanol components

BACKGROUND OF THE INVENTION

Free 3-monochloropropane-1,2-diol (3-MCPD) has been identified as a contaminant for a long time in various foods like liquid seasoning or bakery goods heated to high temperatures. This substance is formed when fat- and salt-containing foods are processed at high temperatures. In animal experiments 3-MCPD has led to an increase in the cell count (hyperplasia) in renal tubules and, at higher levels, it triggered benign tumours. No genotoxic effect was observed. It can, therefore, be assumed that the tumours observed in the long-term animal study (mainly benign) only occur above a threshold value. There are no findings from human studies.

Recent studies have identified 3-MCPD fatty acid esters in refined edible fats and in fat-containing foods. 3-MCPD esters are compounds of 3-MCPD and various fatty acids which are formed at high temperatures under hydration following a reaction between fats and chloride ions. Studies by the food control authorities in Baden-

Württemberg showed that all refined vegetable oils and fats contain 3-MCPD fatty acid esters. Only oil that had not undergone any heat treatment (e.g. native olive oil) did not contain the substance.

3-MCPD fatty acid esters are formed at high temperatures, probably during the deodorisation of edible fats and oils, the last stage in refinement, during which undesirable odorous and taste-bearing substances are removed. Besides 3-MCPD fatty acid esters also 1,3-dichloropropane-2-ol (1,3-DCPO) fatty acid esters have been
 5 identified in heat processed foods.

It has been hypothesized that 2,3-epoxy-1-propanol is an important intermediate in the formation of 3-MCPD and 1,3-DCPO. It is plausible that the same holds for the fatty acid esters of these propanols.

No toxicological data are available on 3-MCPD fatty acid esters, nor for that
 10 matter on any of the other above mentioned propanol fatty acid esters. Nonetheless, it would be desirable to have available a simple, mild, but effective process for the removal of these unwanted propanol fatty acid esters.

15 | SUMMARY OF THE INVENTION

The inventors have developed a process that enables the effective removal of chloropropanol components from triglyceride oils, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free
 20 epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof, and said process comprising:

- contacting a triglyceride oil that is contaminated with unwanted propanol components with a silicate adsorbent selected from the group consisting of magnesium silicate, calcium silicate, aluminum silicate and combinations of these
 25 silicates; and
- recovering a decontaminated triglyceride oil having a reduced concentration of the unwanted propanol components.

The present process is used to treat unused triglyceride oil in order to remove the unwanted propanol components before the oil is used in food preparation.

30 | In a first aspect, there is provided a process for removing unwanted propanol components from unused triglyceride oil, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof, and said process comprising:

- contacting a triglyceride oil that is contaminated with unwanted propanol components with a silicate adsorbent selected from the group consisting of magnesium silicate, calcium silicate, aluminum silicate and combinations of these silicates; and
- recovering a decontaminated triglyceride oil having a reduced concentration of the unwanted propanol components.

In a second aspect, there is provided the use of a silicate adsorbent as defined above for reducing the concentration of unwanted propanol components in triglyceride oils, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof.

In a third aspect, there is provided a deodorized triglyceride oil selected from palm oil, a palm oil fraction or a combination thereof, said deodorized triglyceride oil being characterized by a 3-MCPD content that is equivalent to less than 300 µg/kg of non-esterified 3-MCPD, preferably equivalent to less than 200 µg/kg of non-esterified 3-MCPD and even more preferably is equivalent to less than 100 µg/kg of non-esterified 3-MCPD.

In a fourth aspect, there is provided an infant food comprising from 0.3-80 wt.% of a deodorized triglyceride oil as defined above.

The use of silicate adsorbents for regenerating used frying oils is known and described in the following patent documents: US 4,681,769 (Reagent Chemical & Research Company); US 4,735,815 (Harshaw/Filtrol); US 5,597,600 (The Dallas

Group of America); US 6,187,355 (The University of Georgia Research Foundation, Inc.); US 2007/0154602 (Michael C. Withiam).

The oil refining process of the present ~~invention~~disclosure offers the advantage that it enables the selective removal of the unwanted propanol components. Free fatty acid levels, for instance, are not greatly affected by the present process. The present process can be carried out using standard equipment that is readily available in oil processing factories. Furthermore, the present process can be carried out under mild conditions, e.g. at relatively low temperatures. Finally, the present process offers the advantage that it does not adversely effect the stability of the triglyceride oil

The present ~~invention~~disclosure also encompasses the use of the aforementioned silicate adsorbent for reducing the concentration of unwanted propanol components in triglyceride oils, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof.

DETAILED DESCRIPTION OF THE INVENTION

Accordingly, one aspect of the present invention relates to process for removing unwanted propanol components from unused triglyceride oil, said unwanted propanol components being selected from free chloropropanols, chloropropanol fatty acid esters, free epoxypropanols, epoxypropanol fatty acid esters, and combinations thereof, and said process comprising:

- contacting a triglyceride oil that is contaminated with unwanted propanol components with a silicate adsorbent selected from the group consisting of magnesium silicate, calcium silicate, aluminum silicate and combinations of these silicates; and
- recovering a decontaminated triglyceride oil having a reduced concentration of the unwanted propanol components

The term "oil" whenever used herein encompasses both oils that are liquid at ambient temperature and oils that are solid at ambient temperature (fats).