[DESCRIPTION]

[TITLE OF INVENTION]

EDIBLE OIL/FAT IN WHICH CONTENT GLYCIDOL AND GLYCIDOL FATTY ACID ESTER ARE REDUCED, AND METHOD FOR MANUFACTURING SAID EDIBLE OIL/FAT

[Technical Field]

[0001]

The present invention relates to an edible oil/fat in which the content of glycidol and glycidol fatty acid esters is reduced, and a method for manufacturing the same.

[Background Art]

[0002]

Glycidol is a compound in which an epoxy ring is formed at the 2- and 3-positions of a glycerol framework. In recent years, glycidol fatty acid esters in which fatty acids are ester-bonded to glycidol have been detected in a plurality of types of edible oils/fats. It has been reported that, particularly, the content of palm oils/fats and refined edible oils/fats made from palm oils/fats as a raw material is relatively high among oils/fats in which the presence of glycidol fatty acid esters is confirmed (Non-Patent Literature 1).

[0003]

When a glycidol fatty acid ester is ingested in the body, there is a concern that it will be hydrolyzed by the action of lipase present in the body and produce glycidol. Glycidol is classified as “Group 2A” by the International Agency for Research on Cancer (IARC). “Group 2A” is the group into which compounds that are probably carcinogenic to humans are classified (Non-Patent Literature 2).

[0004]

continuous type or the like. If the amount of the oil/fat to be treated is small, it is preferable to use a batch type device, and if the amount thereof is large, it is preferable to use a semi-continuous type or continuous type device.

As the semi-continuous type device, for example, a Gardler type deodorizing device composed of a deodorizing tower including several trays can be used. This device performs processing by supplying an oil/fat from the upper part, making contact between the oil/fat on the tray and water vapor for an appropriate time, and then lowering the oil/fat to the lower tray, and moving it while intermittently lowering it one batch at a time. As the continuous type device, a thin film deodorizing device or the like that can bring a thin film-like oil/fat into contact with water vapor can be used. It is preferable to use a semi-continuous type device because the temperature and the amount of water vapor used can be managed.

[0027]

In the present invention, the content of glycidol and glycidol fatty acid esters is measured by the following method.

[0028]

0.3 mL of isooctane is added to 100 mg of an oil/fat sample, and the oil/fat sample is dissolved. 3 mL of a sodium bromide solution containing 90 U/mL lipase is put into a test tube, and the test tube is shaken with a shaker for 30 minutes. After the test tube is heated at 80°C for 10 minutes, the test tube is allowed to cool or water-cooled until it reaches room temperature. 50 μL of a 2.0 μg/mL internal standard mixed solution and 3 mL of hexane are put into the test tube, and the lid is closed. The test tube is stirred with a Vortex mixer and centrifuged, and an aqueous layer is then transferred to a new test tube with a Pasteur pipette. 3 mL of hexane is added to the test tube to which the aqueous layer has been transferred, the lid is closed, stirring is

performed with a Vortex mixer, centrifuging is performed and an organic layer is then removed. 20 μL of a phenylboronic acid solution and 3 mL of hexane are added to the test tube, and the lid is closed. The test tube is shaken with a shaker for 10 minutes. The organic layer is transferred to a new test tube with a Pasteur pipette. The organic layer in the new test tube is concentrated to 0.5 to 0.8 mL with nitrogen gas, and analyzed through GC-MS.

Here, for GC-MS, quantification is performed using molecular ion peaks m/z 147 and m/z 150.

Examples

[0029]

Hereinafter, the present invention will be described in more detail with reference to examples. Here, in the examples, % is based on weight.

[0030]

As the physically refined palm oil, a physically refined palm oil (RBDPO) obtained by degumming, decolorizing, and deodorizing a crude palm oil (CPO) with a phosphoric acid aqueous solution was used.

[0031]

(Example 1)

A physically refined palm oil having a 3-MCPD concentration of 0.31 mg/kg was subjected to a decolorizing-deodorizing step. 0.1 weight% of a 50% citric acid aqueous solution based on the weight of the oil/fat was added to a physically refined palm oil as a raw material. 1.5 weight% of activated clay based on the weight of the oil/fat was added, and a decolorization treatment was performed with stirring under conditions of 110°C and 1,330 Pa for 10 minutes. After the decolorization was completed, the oil/fat from which the activated clay was removed was deodorized under

conditions of 230°C, 266 Pa, and an amount of vapor used of 3 weight% for 90 minutes. After the deodorization, glycidol fatty acid ester contained in the oil/fat was analyzed.

[0032]

(Example 2)

A physically refined palm oil having a 3-MCPD concentration of 0.45 mg/kg was subjected to a decolorizing-deodorizing step. 0.1 weight% of a 85% phosphoric acid aqueous solution based on the weight of the oil/fat was added to a physically refined palm oil as a raw material. 1.5 weight% of activated clay based on the weight of the oil/fat was added and a decolorization treatment was performed under conditions of 110°C and 1,330 Pa for 10 minutes. After the decolorization was completed, the oil/fat from which the activated clay was removed was deodorized under conditions of 230°C, 266 Pa, and an amount of vapor used of 3 weight% for 90 minutes. After the deodorization, glycidol fatty acid ester contained in the oil/fat was analyzed.

[0033]

(Example 3)

An oil/fat containing a physically refined palm oil having an iodine value of 53, a physically refined palm fractionated oil having an iodine value of 31, and a high erucic acid rapeseed extremely hardened oil mixed at a ratio of 44:57:3 was subjected to a transesterification reaction using 0.2 weight% sodium methoxide as a catalyst. The reaction temperature was set to 80°C, and the reaction time was set to 30 minutes. After the reaction was completed, 5 weight% of a 50% citric acid aqueous solution was added to the oil/fat stirred at a rotational speed of 5,000 rpm using a homo mixer, and the mixture was brought into contact for 1 minute. Then, 20 weight% of warm water at 80°C was added, the mixture was treated for 5 minutes, and the oil/fat was washed with water. The oil/fat washed with water was centrifuged, the aqueous phase was removed,

and a dehydration treatment was then performed under conditions of 110°C and 1,330 Pa for 10 minutes. The 3-MCPD concentration in the transesterified oil obtained in this manner was 0.14 mg/kg. This transesterified oil was subjected to a decolorizing-deodorizing step. 0.1 weight% of a 50% citric acid aqueous solution based on the weight of the oil/fat was added to a physically refined palm oil as a raw material, and additionally, 1.5 weight% of activated clay based on the weight of the oil/fat was added, and a decolorization treatment was performed with stirring under conditions of 110°C and 1,330 Pa for 10 minutes. After the decolorization was completed, the oil/fat from which the activated clay was removed was deodorized under conditions of 250°C, 266 Pa, and an amount of vapor used of 3 weight% for 90 minutes. After the deodorization, glycidol fatty acid ester contained in the oil/fat was analyzed.

[0034]

(Example 4)

A physically refined palm oil having a 3-MCPD concentration of 1.01 mg/kg was subjected to a decolorizing-deodorizing step. 0.1 weight% of a 50% citric acid aqueous solution based on the weight of the oil/fat was added to a physically refined palm oil as a raw material. 1.5 weight% of activated clay based on the weight of the oil/fat was added, and a decolorization treatment was performed with stirring under conditions of 110°C and 1,330 Pa for 10 minutes. After the decolorization was completed, the oil/fat from which the activated clay was removed was deodorized under conditions of 250°C, 266 Pa, and an amount of vapor used of 3 weight% for 90 minutes. After the deodorization, glycidol fatty acid ester contained in the oil/fat was analyzed.

[0035]

(Comparative Example 1)

[CLAIMS]

[Claim 1]

A method for manufacturing an edible oil/fat in which a content of glycidol and glycidol fatty acid esters is reduced, and in which, in a step of decolorizing and deodorizing an oil/fat containing a palm-based oil/fat using a physically refined palm oil as a raw material, the following raw oil/fat is used, a decolorization work step includes a step of adding an acid to an aqueous solution, and the following edible oil/fat is obtained after the step of decolorizing and deodorizing:

a raw oil/fat:

an oil/fat containing a palm-based oil/fat and having a 3-chloro-1,2-propanediol concentration of 1.5 mg/kg or less,

an edible oil/fat after the step of decolorizing and deodorizing:

the content of glycidol and glycidol fatty acid esters is 1.0 mg/kg or less in an equal amount of glycidol.

[Claim 2]

The method for manufacturing an edible oil/fat in which the content of glycidol and glycidol fatty acid esters is reduced according to claim 1,

wherein 0.01 to 10 weight% of the following aqueous solution as the acid is added:

a citric acid and/or phosphoric acid aqueous solution having a concentration of 1 to 85 weight%.

[Claim 3]

The method for manufacturing an edible oil/fat in which the content of glycidol and glycidol fatty acid esters is reduced according to claim 1 or 2,

wherein the deodorizing step is performed under the following conditions:

a degree of vacuum of 100 to 800 Pa,

an amount of water vapor used of 0.5 to 5 weight%,

a deodorizing temperature of 230 to 260°C.

[Claim 4]

A method for reducing a content of glycidol and glycidol fatty acid esters in an edible oil/fat by the method for manufacturing an edible oil/fat in which the content of glycidol and glycidol fatty acid esters is reduced according to any one of claims 1 to 3.