

FEDIOIL

Code of Practice on Oil Refining

Refining

Crude oils and fats, which are obtained by expelling, extraction, or rendering contain substances and trace components, which are undesirable for taste, stability, appearance or further processing. These substances and trace components include seed particles, impurities, phosphatides, carbohydrates, proteins, traces of metals, pigments, waxes, oxidation products of fatty acids, and polycyclic aromatic hydrocarbons (heavy and light) and pesticide residues.

The purpose of refining oils and fats for edible purposes is to remove these undesirable substances and components while maintaining the nutritional value and the stability of the end product.

Chemical Refining

Degumming

The first step of chemical refining is degumming. Its purpose is to remove seed particles, impurities, and partly phosphatides, carbohydrates, proteins and traces of metals.

The crude oil is treated with foodgrade processing aids and/or water at a temperature around 100°C, which leads to hydration of the main part of the phosphatides, proteins, carbohydrates and traces of metals. The hydrated material precipitates from the oil and is removed.

Neutralisation

Alkali neutralisation reduces the following components: free fatty acids, oxidation products of free fatty acids, residual proteins, phosphatides, carbohydrates, traces of metals and a part of the pigments.

The treatment consists in the reaction with an alkali-solution. By this treatment a second phase is formed (soap stock), in which phase the undesired substances are dissolved. This phase is separated and removed.

Bleaching

The purpose of bleaching is to reduce the levels of pigments such as carotenoids and chlorophyll, but also residues of phosphatides, soaps, traces of metals and oxidation products. These trace components can have a negative effect on the course of further processing and on the quality of the final product.

These substances are removed by adsorption with activated clay and silica. If also heavy polycyclic aromatic hydrocarbons are present, activated carbon shall be used for their removal.

Dosage of these adsorption agents should be adapted to ensure the removal of the specific substances.

The bleaching clay containing all these substances is separated by filtration.

Those processes are partly done under vacuum and at temperatures below 150°C.

Deodorization

The purpose of deodorization is to reduce the level of free fatty acids and to remove odours, off-flavours and other volatile components such as pesticides and light polycyclic aromatic hydrocarbons by a

stripping media. Careful execution of this process will also improve the stability and the colour of the oil, whilst preserving the nutritional value.

The deodorization process is carried out under vacuum (0.5 – 8 mbar) and at temperatures between 180° - 270°C, and using a stripping media.

Conditions should be adapted within these ranges as appropriate to ensure the removal of the specific substances.

PHYSICAL REFINING

Degumming

In physical refining degumming aims at removing seed particles, impurities, phosphatides, proteins, carbohydrates and traces of metals.

The degumming treatment is basically the same as under chemical refining, but the process conditions are chosen such that almost complete removal of above-mentioned components is obtained.

Bleaching

The purpose of bleaching is to reduce the levels of pigments such as carotenoids and chlorophyll, but also residues of phosphatides, traces of metals and oxidation products. These compounds can have a deleterious effect on the course of further processing and on the quality of the final product.

These substances are removed by adsorption with activated clay and silica. If also heavy polycyclic aromatic hydrocarbons are present, activated carbon shall be used for their removal.

Dosage of these adsorption agents should be adapted to ensure the removal of the specific substances.

The bleaching clay containing all these substances is separated by filtration.

Those processes are partly done under vacuum and at temperatures below 150°C.

Deodorization

The purpose of deodorization is to reduce the level of free fatty acids and to remove odours, off-flavours and other volatile components such as pesticides and light polycyclic aromatic hydrocarbons by a stripping media. Careful execution of this process will also improve the stability and the colour of the oil, whilst preserving the nutritional value.

The deodorization process is carried out under vacuum (0.5 – 8 mbar) and at temperatures between 180° - 270°C, and using a stripping media.

Conditions should be adapted within these ranges as appropriate to ensure the removal of the specific substances.

Dewaxing

Some oils like sunflower oil contain waxes, which crystallise at low temperatures and give to the oil a turbid appearance. To remove these waxes, different procedures are applied. They all have in common the low temperatures at which the waxes crystallise.

ALL STEPS ARE CARRIED OUT ACCORDING TO GMP AND HACCP PRINCIPLES.

March 2002