

Heat induced model Isomerisation of Oleic and Linoleic Acid

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Heat induced *cis-trans* isomerisation of the double bonds of fatty acids is well known at deodorisation and at physical refining where the temperatures reach 200-260 °C and overheated water steam is present.

Cis-trans isomerisation of the double bonds of oleic and linoleic acid was studied under the model conditions. Two vegetable oils were used: sunflower oil and high oleic sunflower oil. These oils differ in the content of oleic and linoleic acids. The conditions of the isomerisation were following: temperature range 240-300 °C, Ar atmosphere (atmosphere without water steam) and long period of the reaction (several hours).

Cis-trans isomerisation of the double bonds of fatty acids caused by high temperature is not equilibrium action. *Trans*-isomers are formed till the reactant is not exhausted. It means that the degree of isomerisation can reach 100 %.

The rate of *cis/trans* isomerisation of linoleic and oleic acid is dependent on the temperature, on their content in the vegetable oil (on their ratio) and on the time of the reaction. The rate of *cis/trans* isomerisation of linoleic acid is faster than the rate of *cis/trans* isomerisation of oleic acid. Isomerisation of oleic acid took place at 300 °C. *Cis/trans* isomers of linoleic acid are not formed in the same ratio - *cis/trans* 9, 12 isomers are overriding. The formation of *all-trans* isomers is the less probable.

The formation of *trans*-octadecenoic isomers at lower temperatures (240-260 °C) is probably connected with the isomerisation of linoleic acid and with the polymerization of linoleic acid.

These isomers are formed by the saturation of one double bond of linoleic acid and simultaneously polymerization and isomerisation take place.