

Effect of elevated temperature and UV radiation on molecular structure of linoleic acid by ATR-IR and two-dimensional correlation spectroscopy.

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Streszczenie

The effect of elevated temperature (44°C) and ultraviolet (UV) radiation on molecular structure of linoleic acid (LA) was studied by Attenuated Total Reflection Infrared (ATR-IR) spectroscopy. To obtain more detailed information on molecular mechanism of these changes we applied moving-window analysis and two-dimensional correlation spectroscopy (2DCOS). Analysis of the time-dependent ATR-IR spectra of LA before and after UV irradiation revealed the structural changes in molecules of LA. The extent of these changes was significantly higher after an application of UV radiation. During 24h experiment temperature was constant, therefore the spectral changes result from relatively slow processes (and requiring more energy), e.g. *cis/trans* isomerization, disruption of the C=C double bonds and partial breaking of hydrogen bonds in the cyclic dimers. As a side effect of these structural changes one can observe variations in the orientation of the chains. It is of note that the methyl and methylene groups reveal slightly different behaviour.

Słowa kluczowe

Linoleic acid, Cis-trans isomerization, Adulteration of fatty acids, UV radiation, ATR-IR spectroscopy, Two-dimensional correlation spectroscopy, Moving-window analysis

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