



Migration of Plasticizers into Food

New UHPLC-ESI-MS/MS methods allows for low LOQs

Migration into Food

Plasticizers are added to synthetics, paints, varnishes, adhesives and other functional materials to make these more flexible and elastic.

The migration of plasticizers into food depends on various factors: diffusion constant of the migrating substance, the solubility in the given food, prevailing temperature, contact time, concentration gradient and the surface-to-volume ratio.

Plasticizers generally are soluble in fat, and the migration from packaging into fatty foods such as oils, pesto or seasoning sauces is therefore of major importance.

Plasticizers also occur in dry foods packaged in cardboard, if the latter is glued by dispersion adhesives containing plasticizers or if plasticizers get into packagings through recycled cardboard boxes and cardboard packaged food.

In recent years, diisobutyl phthalate (DIBP) has repeatedly been found in carton packs or carton-packaged foods.

Consequently, cardboard manufacturers voluntarily discontinued the use of phthalates in 2007.

Plasticizers can also enter the human body in other ways, for instance through inhalation of vapors from the floor coverings and wallpapers. Children may accumulate these substances by mouth contact with toys.

Toxicology

In 2005, the European Food Safety Authority (EFSA) evaluated several phthalates and classified diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP) and benzylbutyl phthalate (BBP) as reproductive toxins.

Analysis

The experts of Eurofins for organic contaminants have long-term experience with the analysis of plasticizers. The portfolio comprises analyses of phthalates, adipates, triisobutyl phosphate, acetyl tributyl citrate, 1, 2-cyclohexane dicarboxylic acid diisononyl ester (DINCH) and other substances using either GC-MS or UHPLC-ESI-MS/MS. The methods are applicable on food in general, fats, oils, fish oils and tocopherols.

Especially complex matrices such as fish oil and tocopherols pose significant challenges for the analytical methods.

The UHPLC-ESI-MS/MS method used is extremely sensitive. By using a phenylhexyl phase even chemically similar phthalate isomers (e.g. DBP/DIBP) can be fully separated. The subsequent soft ionisation technique ESI leads to high ion yields and formation of quasi-molecular ions. This technique allows for targeted fragmentation, a necessity for the triple-quadrupole mass spectrometry. These mass transfers significantly increase the selectivity and the differentiation of interfering peaks, the key to reduce the probability of false-positive or false-negative results substantially.

Further information about the plasticizer scopes and LOQs is available on request.

About Eurofins

- Global provider of analytical services
- Competence Centres with state-of-the-art analytical technology
- Local contacts within a global network
- Reliable results on time
- Accreditation according to DIN EN ISO/IEC 17025:2005
- Regular participation in proficiency tests
- Authorized experts for double and cross checks according to § 43 of the German Food and Feed Code (LFGB)
- Express analysis on request

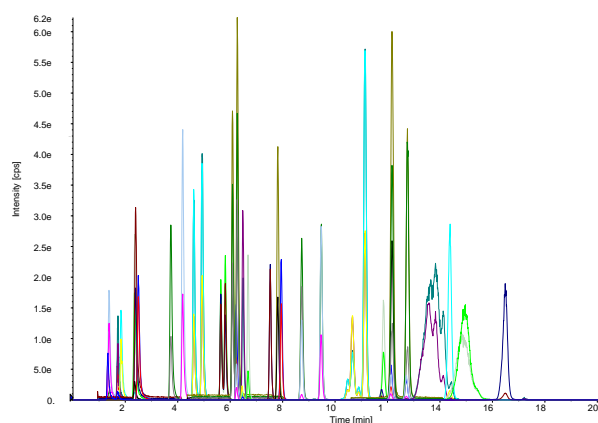


Fig. 1: LC-ESI-MS/MS chromatogram of an analytical standard, (plasticizers in concentrations of 200µg/L each)

