

Evaluation of classic and modified lipid extraction methods for cerebrospinal fluid samples

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Lipids are key compounds in biological systems, exhibiting vital functions, such as the delivery and storage of energy, the constitution of biological membranes or the regulation and control of cellular functions. One of the main application areas of lipidomics is biomedical research, where usually potential correlations between lipid patterns in body fluids or tissue extracts and medical conditions are investigated. Typically, sample types range from blood plasma or serum, urine, conditioned cell culture media, cerebrospinal fluid, serosal fluids (for example, peritoneal, pleural, pericardial, or amniotic fluid) to tissues. Since the late 1950's various lipid extraction methods have been developed, each of them showing different extraction efficiencies and selectivities for the individual lipid classes. Many of these methods have been well characterized using blood plasma or tissue samples, which are usually quite rich in lipids.

The aim of the presented study was to evaluate the most widely used lipid extraction methods using pooled cerebrospinal fluid samples, which naturally show substantially lower concentrations of lipids compared to plasma or tissue samples, making high extraction yields for a broad range of lipid classes a key requirement. In addition, several modifications of classic extraction methods were investigated, such as acidification, the use of salts, or the substitution of chloroform by dichloromethane. All obtained lipid extracts were analyzed using high performance liquid chromatography coupled to a quadrupole time of flight mass spectrometer.

The poster gives a comprehensive overview on the most relevant results, such as the extraction efficiencies of the different extraction methods with respect to the individual lipid classes and the impact of the various modifications.