Modern separation and spectrometric techniques for biological sample lipidom investigation

Due recent progress in field of mass spectrometry the lipidomics, part of metabolomics, is increasing its importance for broad fields of biological study. The aim of this study is to test the lipid extraction techniques and to optimize the preseparation and separation of lipids suitable for mass spectrometry detection. The fragmentation patterns of four, the most abundant lipid classes of glycerolipids (PC, PE, TG, DG), were acquired for the proposed system. These patterns were compared with literature. The most appropriate method for extraction was declared technique according Folch based on methanol and chloroform solution. The preseparation due SPE method is very useful tool for lipid determination. The optimized were focused to reach higher recovery especially in polar lipid fraction. Proposed HPLC system is based on methanol with ammonium buffer, water and isopropanol. The testing was done on three columns with different type of sorbents (Gemini, Syncronis and Kinetex). The separation was evaluated according mass spectrometer response, shape and wide of particular analytes peaks. Composition contains 20% of water was determinate as the best and also the best separation was achieved by Kinetex column. The proposed method was tested on set of fish meat samples which was focused on omega-3 unsaturated fatty acid determination. This study revealed that most of the omega-3 unsaturated fatty acids are present in phospholipids molecules rather than triacylglyceroles.