

P020 Preparation of high-purity lipid hydroperoxides
D. Ibusuki, K. Nakagawa and T. Miyazawa

*Laboratory of Food and Biodynamic Chemistry,
Tohoku University, Sendai 981-8555, Japan*

Oxidative modification of lipids plays an important role in miscellaneous diseases. In atherogenesis, LDL lipid oxidation is the crucial step for foam cell formation in vascular subendothelium. We have reported that phosphatidylcholine hydroperoxide (PCOOH), a primary oxidation product of phosphatidylcholine, is accumulated in patients with hyperlipidemia and diabetes. Generally, standard lipid hydroperoxides (LOOH) are prepared from photo-, enzymatically, or free radical oxidized lipids by using column chromatography. However, the purity of the hydroperoxides is not high (ca. 60-95 % purity, w/w). The lack of highly-pure hydroperoxides has restricted the proper quantitation of hydroperoxides and the experiments of their biological functions.

Here, we employed the reaction between hydroperoxides and vinyl ether (2-methoxypropene, MxP) for LOOH purification. Phospholipids, cholesteryl esters, triacylglycerols, or fatty acids were oxidized, and the resultant products containing hydroperoxides were allowed to react with MxP. Liquid chromatography and mass spectrometry revealed that MxP selectively reacts with LOOH, yielding a stable LOO-MxP adduct (perketal). After the perketal was eluted and isolated, the original LOOH was regenerated by acid treatment. Using our optimized procedures, we are able to produce 75 mg of pure PCOOH (> 99 %) from 100 mg of phosphatidylcholine. This newly developed method provides a variety of pure LOOH references useful in lipid oxidation research.