Oxidative degradation and non-enzymatic browning due to the interaction between oxidised lipids and primary amine groups in different marine PL emulsions

Due to the beneficial health effects of marine phospholipids (PL) there is an increasing industrial interest in using them for nutritional applications including emulsified foods. This study was undertaken to investigate both oxidative and hydrolytic stability of marine PL emulsions in relation to the chemical composition of the marine PL used. Moreover, non-enzymatic browning reactions were also investigated. Emulsions were prepared by high pressure homogenizer using different concentrations and sources of marine PL. In some formulations, fish oil was added in order to study the effect of increasing levels of triglycerides in the emulsions. The oxidative and hydrolytic stability of emulsions was investigated through measurement of peroxide value, free fatty acids, and 31P NMR during storage at 2°C for up to 32 days. The oxidative stability of marine PL emulsions during storage was further investigated through the measurement of secondary volatile compounds by solid-phase microextraction (SPME) and dynamic headspace (DHS) connected to gas chromatography (GC–MS). Non-enzymatic browning reactions were investigated through the measurement of Strecker derived volatiles, colour changes and pyrrole content. The results suggested that the oxidative stability of marine PL emulsions was significantly influenced by the chemical composition and the concentration of marine PL used to prepare them. Emulsions with good oxidative stability could be prepared from marine PL of high purity and high content of PL and antioxidant and low TAG content. © 2012 Elsevier Ltd. All rights reserved.

General information
Publication status: Published
Organisations: National Food Institute, Division of Industrial Food Research
Contributors: Lu, H. F. S., Nielsen, N. S., Baron, C. P., Jacobsen, C.
Pages: 2887–2896
Publication date: 2012
Peer-reviewed: Yes

Publication Information
Journal: Food Chemistry
Volume: 135
ISSN (Print): 0308-8146
Ratings:
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 3.98 SJR 1.762 SNIP 2.331
Web of Science (2012): Impact factor 3.334
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
Original language: English
Keywords: Marine phospholipids, Fish oil, Oxidative stability, Non-enzymatic browning, Pyrrolisation, Strecker degradation
DOIs:
10.1016/j.foodchem.2012.07.008
Source: dtu
Source ID: u::6134
Research output: Contribution to journal › Journal article – Annual report year: 2012 › Research › peer-review