

Distribution of Phospholipids, Cholesterol and Carotenoids in Two-Solvent System during Egg Yolk Oil Solvent Extraction

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Abstract : Egg yolk oil is a concentrated source of egg bioactive compounds, such as fat-soluble vitamins, phospholipids, cholesterol, carotenoids and others. To extract lipids and other fat-soluble nutrients from liquid egg yolk, a two-step extraction process involving polar (ethanol) and non-polar (hexane) solvents were used. This extraction technique was based on egg yolk bioactive compounds polarities, where non-polar compound was extracted into non-polar hexane, but polar in to polar alcohol/water phase. But many egg yolk bioactive compounds are not strongly polar or non-polar. Egg yolk phospholipids, cholesterol and pigments are amphipatic (have both polar and non-polar regions) and their behavior in ethanol/hexane solvent system is not clear. The aim of this study was to clarify the behavior of phospholipids, cholesterol and carotenoids during extraction of egg yolk oil with ethanol and hexane and determine the loss of these compounds in egg yolk oil. Egg yolks and egg yolk oil were analyzed for phospholipids (phosphatidylcholine (PC) and phosphatidylethanolamine (PE)), cholesterol and carotenoids (lutein, zeaxanthin, canthaxanthin and β -carotene) content using GC-FID and HPLC methods. PC and PE are polar lipids and were extracted into polar ethanol phase. Concentration of PC in ethanol was 97.89% and PE 99.81% from total egg yolk phospholipids. Due to cholesterol's partial extraction into ethanol, cholesterol content in egg yolk oil was reduced in comparison to its total content presented in egg yolk lipids. The highest amount of lutein and zeaxanthin was concentrated in ethanol extract. The opposite situation was observed with canthaxanthin and β -carotene, which became the main pigments of egg yolk oil.

Keywords : cholesterol, egg yolk oil, lutein, phospholipids, solvent extraction

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