

Comparison of simple, double and gelled double emulsions as hydroxytyrosol and n-3 fatty acid delivery systems

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Abstract

The purpose of this study was to compare three different emulsion-based systems, namely simple emulsion, double emulsion and gelled double emulsion, for delivery of n-3 fatty acids (perilla oil at 300 g/kg) and hydroxytyrosol (300 mg/kg). Considering that their structural differences may affect their physical and oxidative stability, this was studied by storing them at 4 °C for 22 days in the dark. The results showed that the oxidative status was maintained in all systems by the addition of hydroxytyrosol. However, there was some loss of hydroxytyrosol, mainly during sample storage and during preparation of the gelled double emulsion. Moreover, the antioxidant loss was more pronounced in more compartmentalized systems, which was attributed to their increased surface area. However, the double emulsion was found to be less stable than the gelled emulsion. Overall, the encapsulation of labile compounds in more complex systems needs to be carefully studied and adapted to specific technological and/or nutritional requirements.