

Veiled Virgin Olive Oil. Structure and Dynamics of Nanodispersions Studied by Scattering Techniques

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The quality of Virgin Olive Oil (VOO), the fresh olive juice, is known to depend on the extraction conditions. Of special interest is the unfiltered VOO, known as “veiled” VOO the optimization of which as regards its stability is not yet determined. The present study aimed to investigate and understand the structure and dynamics of the colloidal nanodispersions of unfiltered veiled VOO in relation to the extraction conditions. As a consequence, unfiltered virgin olive oils rich in their minor constituents could be offered to the consumers thus providing their full health benefits.

Structure and dynamics of the colloidal nanodispersions in veiled VOO were investigated by static light scattering (Small angle light scattering apparatus SALSA), dynamic light scattering, based on a 3D Cross-correlation system, a flat cell and a red HeNe-Laser with 632,8 nm wavelength (3D-DLS), classical dynamic light scattering using a goniometer with cylindrical cells and a green laser with 532nm wavelength (Green-DLS) and small angle X-ray scattering (SAXS) and related to the extraction conditions applied by the olive oil producers. VOO samples employed in this study were produced either with the three-phase extraction procedure (oil/externally added water) at different malaxation times or by the dual-phase extraction procedure (no externally added water).

SALSA showed a variation of particle size ranging from 0.5 to 14 μm depending on the olive oil extraction conditions. Ageing of the samples induced size differentiation which also depended on the VOO extraction conditions. SAXS gave almost the same results for all veiled VOO samples examined. When this technique was applied on model olive oil microemulsions size differentiations were observed. When 3D-DLS and Green DLS were applied to the veiled VOO samples, quite different results were obtained. Finally, some of the veiled VOO samples were microscopically examined and the existence of some droplets but no crystals could be observed.