

Moisture Determination in Olive Oil by ^{31}P NMR Spectroscopy

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Water content has long been recognized as an important factor determining the quality of olive oil. Small quantities of water in olive oil are responsible for the creation and persistence of the suspended and dispersed material that constitutes the so-called “veiling” of extra virgin olive oil. Although there are conflicting experimental results in the literature concerning the oxidative stability of veiled olive oil relative to filtered olive oil, the former is not attractive to the consumer mainly due to its appearance.

A method for moisture determination in olive oil using ^{31}P NMR spectroscopy was developed. This method is based on the replacement of the two hydrogens of water molecule with the tagging agents, namely diphenylphosphinic chloride and 2-chloro-4, 4, 5, 5-tetramethyldioxaphospholane. Both reagents were successful in determining moisture in olive oil. Nevertheless, only the first reagent provided a clean and instantaneous reaction under mild condition with no side reactions as observed with the second reagent. A study comparison was made to assess the agreement between the present analytical NMR method and the well established methods of Karl-Fischer titration.