

## Dependence of Free Fatty Acid and Chlorophyll Content on Thermal Stability of Extra Virgin Olive Oil

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**Abstract :** Selective removal of free fatty acid (FFA) and chlorophyll in extra virgin olive oil (EVOO) is necessary to enhance the thermal stability in the condition of the deep frying. In this work, we demonstrated improving the thermal stability of EVOO by selective removal of free fatty acid and chlorophyll using (3-Aminopropyl)trimethoxysilane (APTMS) functionalized mesoporous silica with controlled pore size. The adsorption kinetics of free fatty acid and chlorophyll into the mesoporous silica were quantitatively analyzed by Freundlich and Langmuir model. The highest chlorophyll adsorption efficiency was shown in the pore size at 5 nm, suggesting that the interaction between the silica and the chlorophyll could be optimized at this point. The amino-functionalized mesoporous silica showed drastically improved removal efficiency of FFA than the bare silica. Moreover, beneficial compounds like tocopherol and phenolic compounds maintained even after adsorptive removal. Extra virgin olive oil treated by aminopropyl-functionalized silica had a smoke point high enough to be used as commercial frying oil. Based on these results, it is expected to attract the considerable amount of interest toward facile adsorptive refining process of EVOO using pore size controlled and amino-functionalized mesoporous silica.

**Keywords :** mesoporous silica, extra virgin olive oil, selective adsorption, thermal stability

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