

## LASER INDUCED BREAKDOWN SPECTROSCOPY ASSISTED BY MACHINE LEARNING FOR FOOD SCIENCE APPLICATIONS

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### ABSTRACT

In recent years, Laser Induced Breakdown Spectroscopy (LIBS), a laser based technique, has been proposed as an efficient tool for the rapid elemental analysis of all kind of samples (solids, gaseous and liquids, conductive or dielectric), for various applications ranging from metallurgy, to cultural heritage, security, and even space exploration. LIBS, in contrast to most of the other analytical techniques, does not require time consuming sample preparation procedures, needs only few milligrams of sample, while it can operate on-line and in-situ, providing the elemental analysis of the sample withing few milliseconds. Very recently, the application of LIBS technique aided by machine learning has been proposed by our group for applications related to food science, i.e., foodstuff analysis, safety, and security issues (e.g. mislabelling of foodstuff, fraud assessment, adulteration, etc.)<sup>[1]</sup>.

In this presentation, some representative examples of the application of LIBS assisted by machine learning will be presented, regarding some foodstuffs of great importance for the Greek economy and the agro-food sector, as e.g. the olive oil<sup>[2,3]</sup>, the honey<sup>[4]</sup> and the milk<sup>[1]</sup>. Namely, recent results obtained by our group will be presented and discussed concerning the classification of olive oils based on their geographical origin, the classification/discrimination of honey samples based on their botanical origin, and the classification of milk samples based on their animal origin.

**KEYWORDS:** LIBS, machine learning, food analysis

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