



LIBS analysis of agricultural soils: from laboratory to on-site measurements

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Introduction

Agronomic research has a growing interest in collecting faster, cheaper and still efficient information about agricultural matrices in order to achieve a better monitoring of soil quality and fertility¹. Laser-induced breakdown spectroscopy (LIBS) has been identified to be a high potential technique for on-site elemental analysis of geological materials such as soils².

Materials and Methods

The study of agricultural soils, more precisely the multi-elemental quantification of several chemical elements of interest (P, Mg, Fe, Al, Ca, K...), was realized using a portable LIBS system.

Results and Discussion

The good practices related to sample preparation and LIBS experimental setup to achieve relevant LIBS measurements of soil samples will be discussed. Since quantitative LIBS measurements are generally limited by strong matrix effects, the advantages of applying multivariate approaches for data processing will be presented. Finally, we will discuss the influence of environmental parameters on the LIBS signal in order to assess the feasibility of on-site analysis.

Conclusion

LIBS analyses of agricultural soil samples have been successfully performed in laboratory through the use of multivariate processing, and studies about the influence on the LIBS signal of both sample preparation and experimental conditions are in progress.

Bibliography

¹ J. Sinha, Potential Technology of Precision Agriculture: A review. 4th International Conference on Emerging Trends in Engineering, Technology, Science and Management, 2017, ISBN: 978-93-86171-54-2.

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