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Application of laser induced breakdown in air in conjunction with atomic absorption spectroscopy for detection of trace elements in fennel seeds*

© I. Rehan[1], S. Sultana[2], K. Rehan[1,3,4], R. Muhammad[1], A. Mateen[1], M.A. Farooque[1]

[1] Department of Applied Physics, Federal Urdu University of Arts, Science and Technology,
44000 Islamabad, Pakistan
[2] Department of Chemistry, Islamia College University,
25120 Peshawar, Pakistan
[3] State Key Laboratory of Magnetic Resonance and Atomic & Molecular Physics, Wuhan Institute of Physics and Mathematics,
430071 Wuhan, China
[4] School of Physics, University of Chinese Academy of Sciences,
Beijing, China

e-mail: irehanyousafzai@gmail.com

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A robust approach of laser-induced breakdown spectroscopy (LIBS) in ambient air has been employed to investigate concentration of the trace elements in fennel seeds (saunf) via generation of plasma through the second harmonic of solid state Nd:YAG pulsed laser 532 nm. Spectral emissions of Saunf plasma were acquired with resolution of 0.06 nm in spectral range of (200–720) nm. The experimental determination showed the existence of elements namely, Ca, Al, K, Fe, S, P, Mg, Mn, Sr, Na, and Zn in the sample. However, no toxic elements such as Pb, Cr etc. were perceived. The relative concentrations of detected elements were measured through the intensity of the strongest peak, intensities of every emission from every specie, and calibration free (CF)-LIBS. To indorse the experimental determinations of LIBS, a comparative study was carried out with the outcomes of atomic absorption spectroscopy (AAS). The results of LIBS and AAS were compared by the statistical treatment.

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