P5556: Compositional Analysis of Green Tea Leaves using Laser Induced Breakdown Spectroscopy (LIBS)

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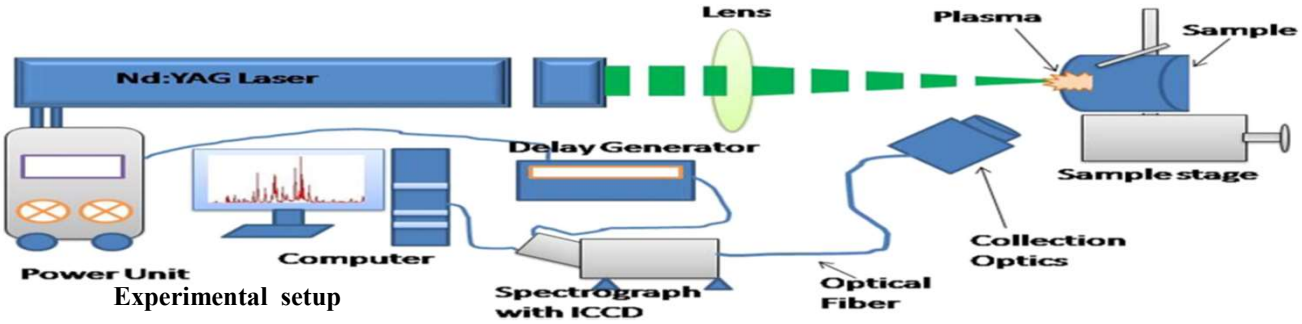
Green tea is a type of tea made from the leaves and buds of Camellia sinensis. To ensure the interests of Green Tea producers and consumers the precise identification of tea varieties is of great significance. Thus, Laser-induced breakdown(LIB) Spectra of Green tea have been recorded for the its compositional analysis.

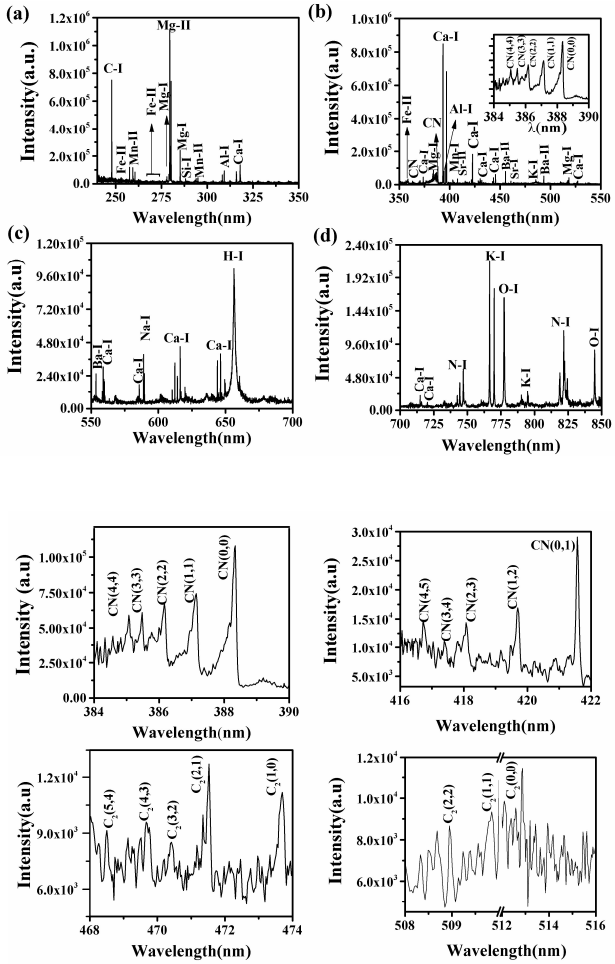
The laser source is Nd:YAG laser (continuum surelite III-10) operating at 532 nm wavelength and capable of delivering a maximum energy of 425 mj with pulse width 4 ns (FWHM) and a maximum pulse repetition rate of 10 hz. In the present experiment a 15cm focal length lens was used to focus the laser beam on the surface of the Green Tea leaves sample.



Experimental setup

Results &Discussion:

- LIBS spectra shows the presence of Mn, Mg, Si, Fe , Ca ,Na , K , as well as organic elements C,N,O,H present in the sample.
- In addition to these essential elements some heavy and toxic elements like Ba, Sr, Al, are also detected in green tea leaves sample which small amounts affect the human heaths.
- Due to presence of C and N in sample the molecular signature of CN band and C2 band was also observed in the sample.
- In LIBS Spectra the intensity is directly proportional to the concentration of species present in the sample there fore the formation of CN and C2 band is corelated to these C and N elements.



Conclusion:

The present work successfully demonstrated the capability of LIBS technique for rapid as well as online quality control tool for the detection of element as well as some molecule present in the green tea sample.