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Dear Editor,

We enclose a manuscript entitled, **“A Novel Approach to Reduce the Sample Consumption for LIBS Based Identification of Materials”** for your consideration in *Defence Science Journal*

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There has been a very significant increase in the Laser Induced Breakdown Spectroscopy applications related to the classification/identification problems over the last couple of years. This can be readily seen in the growing number of publications in this area of research. Also, a few companies have LIBS device with built in chemometrics toolbox.

However, there are large number of issues that needs to be addressed before LIBS can become a trusted toolbox. One particular application that has attracted a very significant interest is related to hazardous material detection, particularly the high energy materials. The sample availability can be a serious constraint while working with such class of samples. Although, LIBS is a semi destructive technique, the need for multiple sets of spectra implies that the entire surface of a sample may be rendered useless after recording the data. Also, multiple data sets imply more amount of sample needed for recording the data.

In this manuscript, we have shown that with very minimally invasive approach, the experiment for classification/identification can be performed. Here, instead of recording a large number of spectra, we have shown that as less as five experimental spectra are sufficient for performing such experiments. The statistics of these spectra are used as input to generate multiple spectra using a normal distribution at all the wavelengths of the spectrum. The classification performance is tested and compared against the traditional approach (where multiple experimental spectra are used for training and testing algorithms). We have employed K – Nearest Neighbour combined with Principal Component Analysis (KNN-PCA) using the data from a set of five high energy materials (HEMs) - HMX, NTO, PETN, RDX and TNT. The classification performance using the proposed method is on par with the traditional approach.

Following is the list of potential reviewers-

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Thank you in advance for your time and consideration in this matter.

G Manoj Kumar

(On behalf of all the authors)