Quantifying soil carbon and nitrogen under different types of vegetation cover using near infrared-spectroscopy: a case study from India

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ABSTRACT
Near Infrared Reflectance Spectroscopy (NIRS) is becoming a promising technique in soil analyses. Several studies have demonstrated the ability of NIRS, for rapid and non-destructive technique for the quantification of soil carbon and nitrogen in different ecosystems. We have used this technique for measuring the soil carbon and nitrogen concentrations in soils from different climatic zones (semi arid, dry sub humid and mist sub humid) under different types of vegetation cover. The effects of different soil moisture contents on predicting equations were developed for the quantification of soil carbon and nitrogen. Soil carbon and nitrogen was successfully predicted (R^2= 0.90 for carbon and R^2= 0.85 for nitrogen) by the equations developed. The standard error of prediction (SEP), standard error of prediction corrected for bias SEP (C) and bias for predicting equations of carbon and nitrogen were 0.73, 0.73, 0.04 and 0.07, 0.07, 0.005, respectively. Our results of soil moisture experiments showed that the equations developed by the NIRS predicted most accurately for carbon and nitrogen in dried soil samples than soils with moisture content. The results of this study showed that NIRS can be used as a rapid and non destructive analytical technique to measure the soil carbon and nitrogen.
Key words: Soil carbon, soil nitrogen, NIRS, India, chemometric analysis.