[Downloaded from jstnar.iut.ac.ir on 2024-04-19]

[DOR: 20.1001.1.24763594.1394.19.72.8.8]

[DOI: 10.18869/acadpub.jstnar.19.72.8]

Capability of vis-NIR Spectroscopy to Predict Selected Chemical Soil Properties in Isfahan Province

F. Khayamim[1], H. Khademi[1*], B. Stenberg[2] and J. Wetterlind[2]

(Received: May. 30-2014; Accepted: Feb. 17-2015)

Abstract

Vis-NIR spectroscopy has been introduced as a non-destructive, fast, and cheap technique, with minimal sample preparation and no loss or damage to the environment. No investigation has yet been carried out to examine the ability of this method to estimate soil properties in Iran. The objective of this research was to investigate the capability of Vis-NIR spectroscopy to predict the amount of organic matter, carbonate and gypsum in surface soils of Isfahan province. A total of 248 surface soil samples were collected from the study area. Soil organic matter content, gypsum and carbonates percentages were measured by standard laboratory methods. Soil spectral analyses were performed by a field spectrometer using 350-2500 nm wavelength range. Different pre-processing methods were evaluated after recording the spectra. Partial least squares regression was used to predict soil parameters. R^2 values for organic matter, carbonates and gypsum were 0.61, 0.45 and 0.8, respectively. Based on RPD (Ratio of Prediction to Deviation) values, the precision of prediction model for gypsum was quite good, and acceptable for organic matter, whereas the prediction of the model for soil carbonates was poor. Consequently, vis-NIR spectroscopy is capable of predicting some soil properties simultaneously and the model accuracy is acceptable.

Keywords: Spectroscopy, Vis-NIR, Organic matter, Gypsum, Carbonates.

1. Dept. of Soil Sci., College of Agric., Isf., Univ., Thechnol., Isfahan, Iran.
2. Dept. of Soil and Environ., Swedish Univ. Agric. Sci, Sweden.
*: Corresponding Author, Email: hkhademi@cc.iut.ac.ir