An Android Application Based Mobile Phone Camera Colorimeter For Determining Soil Nitrate And Phosphorus

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There are different types of soil nitrate and phosphorus testing methods currently used in laboratories. However, most of the methods are expensive and require skilled labor. Also, not all agricultural soils in Sri Lanka can be tested by limited laboratory facilities. In the current study, a mobile phone camera-based colorimeter was developed for testing soil nitrates and phosphorus. The core of this method was the ability of a mobile phone camera to detect red, green, and blue colors (RGB) in a specific colored solution. The soil was reacted with specific chemicals and colored solutions were obtained. A special light box with a 5W LED lamp was made to hold the samples while receiving RGB readings from the solutions. An Android application named Color Grab was used to identify the RGB values in each sample. RGB values and absorption were measured for a standard solution series of nitrate (0 ppm to 50 ppm) and phosphorus (0 ppm to 0.5 ppm), and the calibration curves were plotted. Fifteen soil samples from different locations were tested by mobile phone camera and established spectroscopic methods, and the correlation between the two methods was compared. The results obtained from the proposed camera-based colorimetric method agreed well with the standard spectroscopic method. Therefore, this mobile phone camera-based colorimetric method could be used as a fast, cheap and simple way to test soil nitrate in 0 - 70 ppm range and soil phosphorus in 0 - 0.6 ppm range. Dilution should be done for higher nitrate and phosphorus soils.

Keywords: *Colorimeter, Nitrate, Phosphorus, RGB Values*