

Analysis of Soil Physicochemical and Trace Minerals of Two Different Sub-Tropical Regions of India

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This research was conducted in two separate sub-tropical regions of India to determine soil quality. All the soil samples were obtained from three separate sites, such as each region's agricultural field, roadside, and riverside forest. All samples were analyzed using standard methods for pH, electrical conductivity (EC), total solids dissolved (TDS), soil moisture (SM), water holding capacity (WHC), total organic matter (TOC), carbonate, magnesium (Mg), manganese (Mn), iron (Fe), copper (Cu), and zinc (Zn). Results indicated that the pH, TDS, EC, and Cu levels varied among Himachal Pradesh's three different sources. In Jammu, it was found that SM, SOM, and Cu level was varied among the sources. The study indicated that the pH of roadside soil, riverside soil was significantly ($p < 0.05$) lower in the Jammu region than the Himachal Pradesh region. EC was substantially higher in all the sources of soil in the Jammu region than the soil of the Himachal Pradesh region. The study concluded that the roadside in the Jammu area showed a higher degree of pollution than that of Himachal Pradesh.

Keywords : Agriculture, Himachal Pradesh, Jammu, Total organic carbon, water holding capacity

1. Introduction

The entire ecosystem on this earth is made up of a dynamic soil system. The soil can also be described as part of the earth's crust containing humus (Hopkins, 1948; Gardiner & Miller, 2008). Soil is a finite, non-elastic, and non-renewable human-life asset that extends across natural resources. Soil is the most precious resource and the greatest gift of nature to humankind, as it takes 400-1000 years to form just one inch of topsoil (Twenhofel, 1945).

Rapid industrialization has posed a threat to the soil environment through emissions in recent years (Kiruba & Jeeva, 2010). This disparity has a reliable effect on plant performance and ecosystem performance (Huber-Sannwald & Jackson, 2001). A soil spatial study helps to describe the characteristics of the soil in the landscape, which is an act of vegetation, and other environmental factors are closely related (Maestre et al. 2006).

A significant factor in soil erosion is soil chemical fertility and then degradation (Bashagaluke et al. 2018), especially as a result of nutrient deficiency. However, little work has been done on micro-and macro-nutrient

contamination, source identification, and spatial distribution of micro-and macro-nutrient contamination in subtropical soil in India. It's Thakur et al. (2019) carried out a soil report from Shimla and Kinnaur, Himachal Pradesh. The study indicated that the quantity of mineral was adequate. Sharma & Dogra (2011) stated that the plain area of Himachal Pradesh has sufficient mineral content. Bhatt et al. (2017) reported that the soils of the grape orchard have a higher level of iron, manganese, zinc, and a medium level of copper, boron, and molybdenum.

Very little literature is available on soil physico-chemical and mineral availability at two different altitudes in the subtropical region of India. The objectives of this study were, therefore (1) to analyze different physico-chemical properties and levels of minerals at two different altitudes, Jammu and Himachal Pradesh, India, (2) investigate the difference between the two altitudes based on different physicochemical and mineral levels.

2. Materials and Methods:

2.1. Study area:

The study was carried out in two different altitudinal regions (Jammu and Himachal Pradesh) of India. Those two

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