Editorial
Volume 8:5, 2021

Journal of Environmental Analytical Chemistry

ISSN: 2380-2391 Open Access

Characteristics of Soil Chemicals

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Editorial

Chemical characteristics of soils range from inorganic cations that are adsorbed on the surface of clay materials, such as Calcium (Ca), Sodium (Na), Magnesium (Mg), Potassium (K), and so on, to those found mostly within the organic matrix of the soil, such as organic matter, C, N, P, and S. Documented data on the impact of fire on individual chemical constituents of soils and organic matter is inconsistent, leading to conflicting interpretations on the nature and significance of chemical changes that occur after a fire. According to various tests, soil chemical constituents rise, decrease, or remain constant. This is especially true for studies looking at changes in nitrogen and other nutrients that can easily volatilize during a burn (for example, organic matter, sulphur, and phosphorus). The formula used to calculate the chemical constituents is the primary source of disagreement.

Chemical variations may be expressed as percentages (or other concentration expressions, such as ppm or mg/kg) or as individual changes in cumulative quantities of the constituent (for example, pounds per acre or kg/ha). The percent of a given chemical constituent in a pre-fire sample, which may contain varying quantities of organic matter, is normally calculated before fire. Following a blast, the weight of a burnt sample containing various concentrations of ash as well as charred and unburned organic matter is used to calculate the percent of the same chemical constituent. As a result, there is a lot of debate about nutrient shifts when various bases are used to calculate the difference in a chemical constituent.

A research on the impact of fire on N loss during heating was the first to report this confusion between percentages and overall numbers. The discrepancies between percent N and total sum of N began at 212°F (100°C) and grew until about 932°F (500°C), according to this report. Because of the difficulty in understanding concentration and percentage statistics, the subsequent discussion of fire-related chemical constituent changes in wildland environments will begin with the more basic changes in chemical constituents.

Fire, on the whole, never increases the overall number of chemical elements. The overall number of various chemical elements on a burned site would most likely decrease, but it could stay the same in some situations. However, fire alters the shape of various components, making them more accessible to plants and other biological species in many ways. Complete N found in ecosystem organic matter is a textbook example of this.

Complete N at the site is often reduced when organic matter is combusted, though increases in the available types of N are likely to occur, as stated in the "Nitrogen" section. As a result, administrators must be cautious when evaluating the importance of the sometimes-conflicting shifts in various nutrients recorded in the literature during a burn. The following parts would describe these developments in terms of the underlying chemical processes, as well as the management consequences for soil and habitat productivity, as well as postfire management.

How to cite this article: Nikitha Yerram. "Characteristics of Soil Chemicals." J Environ Anal Chem 8(2021): 314

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Received 13 May, 2021; **Accepted** 18 May, 2021; **Published** 25 May, 2021