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A REVIEW - IMPORTANCE OF PHYSICO-CHEMICAL PROPERTIES IN SOIL QUALITY

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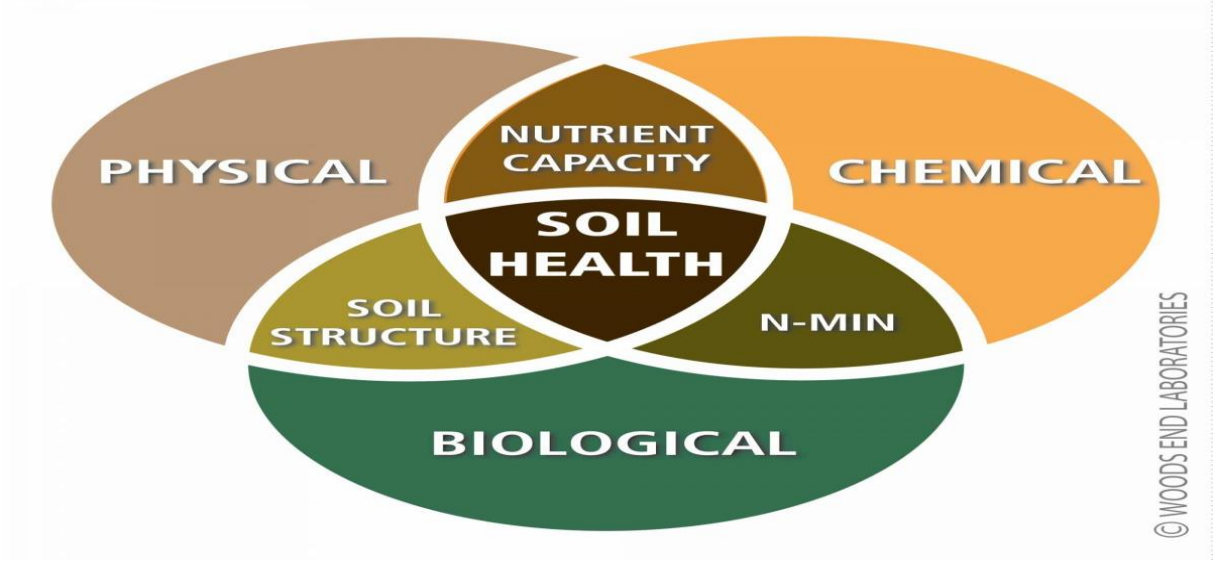
ABSTRACT

The basic need of human beings for survival is food, clothes, and shelter which is completed through the medium of soil. Soil quality plays most important role in global cultivation of funnel wheat, rice, juvar, sugarcane, groundnut, vegetables, fruits, etc. For perception of physico-chemical properties of any soil is very important for good quality and quantity of food yielding. By this analysis the farmers are aware from economic productivity. Physico-chemical analysis of soil is consistent with the different parameters which include pH, Electric conductivity, Moisture, Texture, Temperature, nitrogen, phosphorus, potassium, Soil Organic Matter, etc.

Keywords: Soil Composition, Soil quality, Soil fertility, Physico-chemical parameter

INTRODUCTION

Latin word “sollum” means Floor(soil). Soil is for multiple uses like agriculture, forestry, filtering, buffering and transformation activities between atmosphere and groundwater, protecting a food chain and drinking water against pollution and biodiversity said by Dr. W. E. H. Blum. J. S. Kanwar said that soil can be called as Soul of Infinite Life because it gives nutrients, water, air and encourage and supports life on earth (Joffe and J. S., 1949). Soil is a biological body of mineral and organic material differentiated into horizons (Joffe, 1936). The mixture of rocks, minerals and organic material is not called as soil, it is called as soil material. Soil is consider as living body as it has a rudimentary stage with potential for development (Wagh et al.,2013). The mineral or organic material, which is uncoupled, on the immediate superficial of earth that provides as a biological medium for the development of plant (USDA). Pedology educate that soil is a marked body in nature comprising of determinate parts, each having actinic, physical, and natural properties of its own (Joffe and J. S., 1949). Hilgard the American soil investigator in 1892 defined soil as, “The increase or decrease loose and powdery material which help plant root to provide material which helps the plant to develop. “For growing establish resource management plan and action of for realizing and synchronizing the action of terrestrial ecosystem at both global and regional scale (Schnitzer and M. ,1986). The ability of soil land management borders and operate within ecosystem to sustain biological fertility, promote quality of air and water, and maintain plant, animal and human health (Bünemann et al.,2018). For determining growth of plant soil fertility is an important factor. By providing essential plant nutrients and favorable chemical, physical and biological characteristics as a habitat for plant growth. N, P, K plays a major role in soil fertility (Hartemink and A. E., 2010).



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ROLE OF PHYSICO-CHEMICAL IN SOIL QUALITY

Physico-chemical parameters of the soil used for development of forest and agricultural products. By physico-chemical analysis of soil, we can know by which component soil is made up. For planning fertigation, soil physico-chemical properties are important (Kekane et al.,2015).

pH

The Swedish scientist Sorensen (1909) gave the pH word. pH determines the soil is acidic or basic (Thomas and G. W., 1996). pH is the 'negative logarithm of the hydrogen ion concentration [H+]', i.e., pH = -log [H+]. Soils are referred to as being acidic, neutral, or alkaline (or basic), depending on their pH values on a scale from approximately 0 to 14. A pH of 7 is neutral (pure water), less than 7 is acidic, and greater than 7 is alkaline (McCauley et al.,2009). Coagulation performance is affected by the pH (Youcal and Z. 2018). Normally the pH of most soils ranges between 3 to 8.5. If the soil pH is below 3-4 it means soil contain free acids, like Acid mine drainage and Acid sulfate soil. If soil pH is more than 8.45 called as alkali soils and they have good ability of exchangeable sodium. The idea of soil suspension is discussed only in relation with properties of ionic atmosphere around soil particles (N.S. Bolan and K. kandaswamy,2005).

Texture

For recognizing the classes of agricultural soil based on their physical structure soil texture is used, it is a qualitative classification used in field and laboratory both. In different region soil texture is differ from the size of soil particles. Aeration, Soil-water relation, and root penetration are affected by the soil texture (SS Kekane et al.,2015).

Moisture

As soil moisture plays an important role in development of weather patterns and production and precipitation, it is the most important parameter of soil. Soil moisture basically shows the water content of soil. Void ratio, particle size, clay minerals, organic matter and ground water condition are the main characters on which soil moisture is dependent (Yannawar et al.,2013).

Soil Temperature

For calculating most underfoot ecosystem processes which include respiration root grow, decomposition, and nitrogen mineralization soil temperature are Important. (Richard H. Waring and Steven W. Running,2007) As the growth of biological systems is closely controlled by soil temperature in agriculture and land treatment of organic wastes, soil temperature is often a significant factor.(YOLCUBAL and L.G. WILSON,2004)

Electric Conductivity

For measuring the health of soil, electric conductivity is used which is very simple, quick, and inexpensive method. For knowing which ions are present in solution this method is useful. The electrical conductivity of a soil solution proportional with the concentration of ions (Datta et al.,1993). For estimating soluble salt concentration in soil as measuring the salinity of soil electric conductivity is used (Wagh et al.,2013). measure of soluble nutrients, determining soil salinity electric conductivity is associated (Smith et al.,1996).

Nitrogen

Such factors like soil depth, vegetation, particle size, cultural history, and climate, these are reasons which affect soil nitrogen. This element encourages above ground vegetation growth and gives a deep green color to the leaves. In plants nitrogen is in the form of NO_3 and NH_4(Sumithra et al.,2013). For growth and development of the plant this element is major nutrient. For the synthesis and transfer of energy which involves protein, enzymes, and metabolic processes this element plays an important role (Singhet al.,2013).

Phosphorus

For the plant growth the phosphorus plays an important role. Phosphorus present in plant nuclei and it help to store energy and help in transfer of energy (Jain et al.,2014). Phosphorus present in more amount at topographic region of soil than the lower topographic region of soil (Singh et al.,2013).

Potassium

Potassium plays a key role in plant, it is maintaining the plant water balance and protein synthesis which is very important for plant growth (Sumithraat et al.,2013). Sufficient amount of this element develops faster and give protection to plant against any disease, insect damage and to develop tolerate capacity against the low temperature (Solanki Ha and Chavda,2012).

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Soil Organic matter

Tateand Theng in 1987 described the form and classification of soil organic matter. Mostly soil organic matter are derived from plant tissue. 60 to 90 percent of moisture contain by plant residues. Carbon(C), oxygen(O), Hydrogen(H) small number of Sulfur(S), Nitrogen(N), phosphorus(P), potassium(K), calcium (Ca) and Magnesium (Mg) are present in remaining dry matter. In soil fertility management these nutrients are very important. Variety of compounds are consisted by soil organic matter, and they all are in various proportions and many intermediate stages, 10 to 40 percent microorganisms are in active organic fraction, in 40 to 60 percent stable or resistant organic matter present and it also known as humus. As Soil Organic Matter leave a strong effect on soil properties and function it plays a critical role in soil health (Hatten et al.,2019). Organic Carbon is highly reservoir by Soil Organic Matter (SOM). Different structure and consequently different properties of algal, plant and microbial material derived compounds are consisted by Soil Organic Matter (SOM) (Matocha and C. J. ,2005).

CONCLUSION

In this review paper we can conclude that, Over last few years, soil quality decreases as most of the farmers use more amount of chemicals and fertilizers. Analysis of soil parameters is important because small crops are pretentious due to excessive use of fertilizers and pesticides (Narkhedeet al.,2011). For nutrient management and soil management practice above information is very helpful for farmers. Physico-chemical analysis can help in the development of plant and soil management. This analysis also helps farmers by improving the quality of crops and by increasing crop yield. It can also be important for solving the soil related problems by being aware of which type of soil is and finding suitable way. Most important use of this analysis is farmers can get the idea through how much number of which fertilizers and nutrients are required to soil for good yield of crops. As this analysis help in increasing quality and quantity of crop rises economic value which help to improve the economic status of farmers.

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