DETERMINATION OF PHYSOCHEMICAL PROPERTIES OF SOIL BEFORE AND AFTER AGRICULTURAL ACTIVITIES

SUPERVISOR:

PROFESSOR MADYA TS DR. SARIFAH FAUZIAH BINTI DRAMAN

SCHOOL OF CHEMICAL ENGINEERING
COLLEGE OF ENGINEERING

2023

ABSTRACT

Soil as diverse and dynamic natural resource is crucial to produce food, fibre, and other products as well as a vast choice of ecological services. For many applications, including agriculture, forestry, and environmental management, it is essential to understand the physical and chemical properties of soil. In this study, physical and chemical properties in the watermelon farm's soil before and after agricultural activities has been analysed. Texture, structure, bulk density, porosity, and pH were evaluated on agricultural and non-agricultural soil samples. Fourier Transform Infrared Spectroscopy (FTIR) was carried out to identify functional group of organic matter in the soil. Results shows that the pH, nitrogen, and organic matter of agricultural soil were lower than those of non-agricultural soil. Agriculture altered the texture and structure of the soil. These data show that agriculture considerably influences soil physical and chemical properties and underline the significance of sustainable farming approaches to maintain soil health

TABLE OF CONTENTS

CHAPTER ONE
BACKGROUND

1.1 Introduction

Soil is an intricate and dynamic natural resource that is necessary for the production of food, fibre, and other items, as well as a vast array of ecological services. It is a mixture of minerals, organic matter, water, and air that is produced by the weathering of rocks and the decomposition of organic waste (Doran & Parkin, 2015). The qualities of soil vary greatly based on the type of parent material, climate, vegetation, and other elements, and are modified by both natural and human processes (FAO, 2015)

Understanding the physical and chemical qualities of soil is essential for numerous uses, such as agriculture, forestry, and environmental management. Chemical properties include pH, nutrient content, and the presence of pollutants, whereas physical properties include the soil's structure, texture, and bulk density.

Soil structure refers to the arrangement of soil particles into aggregates or clumps, and is controlled by the kind and quantity of clay and organic matter, as well as the presence of roots and other biotic elements (FAO, 2015). Soil structure can significantly influence the availability of water and nutrients to plants, as well as the soil's capacity to sustain plant growth(Doran & Parkin, 2015).

Soil texture refers to the relative quantities of sand, silt, and clay particles present in the soil and has a substantial impact on the soil's physical attributes, such as its water-holding capacity, infiltration rate, and erosion resistance (FAO, 2015). Soil texture is essential for identifying the suitability of soil for various applications, such as agriculture or forestry, and can be influenced by climate and plant life (Doran & Parkin, 2015).

Soil pH is a measure of the acidity or alkalinity of the soil, and it can have a substantial effect on the availability of nutrients to plants and the prevalence of specific soil microbes (FAO, 2015). Soil pH can be modified by factors including the kind of parent material and the presence of organic matter, as well as by human activities like the use of chemical fertilizers(Doran & Parkin, 2015).

The amounts of nutrients such as nitrogen, phosphorous, and potassium, which are needed for plant growth, are also crucial soil qualities (Doran & Parkin, 2015). These nutrients' availability can be modified by soil pH, the presence of organic matter, and the type of parent material (FAO, 2015).

Understanding the physical and chemical features of soil is vital for the sustainable management and protection of soil resources. By comprehending these features, we can gain a better knowledge of the suitability of soil for a variety of applications and apply practices that preserve soil health and fertility. This can assist to ensure that future generations have continuing access to this crucial natural resource.