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Kampus Bukit Besi

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DETERMINATION OF PLASTIC POLLUTION AND ITS DEGRADATION IN SOIL AT CHILI FERTIGATION AREA

PREPARED BY:
MUHAMMAD AMIRUL NAZMI BIN MUHAMMAD ALFIAN
(2020895042)

SUPERVISOR:
PROF. MADYA TS. DR. SARIFAH FAUZIAH BINTI SYED DERAMAN

ABSTRACT

Plastics are popular due to their affordability, adaptability, and durability. However, poor management and high manufacturing make plastic trash an environmental hazard. 2015's oceans received 250 million tonnes of plastic. Microplastics were first found in marine environments, but they now accumulate in soils. Plants can also absorb and transport microplastics. Plastic mulch has increased globally in agriculture over the past decade, warming soil and improving crop yields. However, soil contamination and microplastics spread. Biodegradable plastics and poor waste management pollute soil microplastics. Fruit packing foam, used in agriculture for aesthetics, efficiency, and hygiene, also contains microplastics. However, buried foam can break and contaminate farmlands. The research area was conducted at Kebun Cili Fertigasi DinDang, Sungai Petani, Kedah (5.5721227244559355, 100.47853462026741). There are presences of plastic particles in soil samples after ATR-FTIR analysis has been performed on the samples. Therefore, this research study was conducted in order to extract plastic from soil sample taken from the research area and to identify the plastic pollution that present. The process that went through to obtain the product were soil sampling, soil & plastic size separation, density separation, alkaline digestion and FTIR analysis. The product that obtained from the soil sample was identified as polyethylene through FTIR spectrum. Therefore, FTIR analysis was successful as the best method to identify the type of plastic present and also to find the characteristic of the plastic for further examination.

TABLE OF CONTENTS

CHAPTER ONE
BACKGROUND

1.1 Introduction

Plastics are widely used because of their availability, versatility, and durability. Over the past 50 years, 9.1 billion tonnes of plastic have been produced worldwide, with an 8.7% annual growth rate (Geyer et al., 2017). However, plastic rubbish poses a serious environmental risk due to poor management and excessive manufacture. 2015 saw the release of 250 million tonnes of plastic into the ocean (Wright & Kelly, 2017). Microplastics are smaller pieces of plastic that can break down into trash when it is subjected to UV radiation, water erosion, and wind (Gewert et al., 2015). Microplastics are defined as particles that are less than 5 mm in size and can be produced either initially or subsequently (Kunz et al., 2016). Although microplastics were first identified in coastal habitats, they have recently been found in terrestrial settings and have the ability to accumulate in soils (Liu et al., 2018, Horton et al., 2017). These microplastics are commonly consumed by many species, and it has been found that they carry contaminants. Studies have also revealed that plants have the ability to transport and absorb microplastics. Globally, the use of plastic mulch in agriculture has grown over the last ten years, bringing with it benefits like improved crop yields and greater soil temperature. But as a result, microplastics have spread and poisoned the soil (Fakour et al., 2021). Plastics are widely used in agriculture, from plastic-coated seeds to protective covers that change the temperature of the soil and prevent weeds from growing over crops (*Plastics Are Piling up in Soil across the World Warns UN Environment Agency, 2022*). Soil microplastic pollution is a result of both inefficient waste management and biodegradable plastics. Another source of microplastics is fruit packaging foam, which is used in agriculture for sanitation, efficacy, and aesthetics. However, this foam can readily fracture when buried in soil and contaminate farmlands. The use of public utilities for rail or electrical lines, as well as roadside farming, can contaminate the soil. (Fakour et al., 2021)