TITLE:

Synthesis of Biofilm filled with PLA and Chlorella algae

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ABSTRACT

The public is becoming more and more interested in ecologically friendly packaging options, with biodegradable plastic being one of the numerous solutions. Because it offers a biodegradable alternative to numerous items, PLA was chosen in this investigation. PLA's brittleness and slow rate of degradation, however, restrict its usage. To save expenses and speed up deterioration, chlorella algae are utilised as fillers. This study investigated the adhesion potential of biofilm composites between PLA and Chlorella and characterised the FTIR and moisture content, respectively. Making PLA/Alga composites using the solvent casting technique is the most efficient method.

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CHAPTER ONE
BACKGROUND

1.1 Introduction

This research study focuses on the synthesising biofilm from microalgae Chlorella and Spirulina combine with PLA to develop algal-based biofilm and. The algal protein biomass can grow on nutrient-rich wastewater from livestock farms, municipal or industrial effluent sources, remediating the excess nitrogen and phosphorus. The algal bioplastics provide biodegradability that can be tailored to have a wide range of material properties suitable for various applications-consumable and disposable plastic products, agricultural plastic products, and horticultural planting containers. According to experimental results, pressure, temperature, content of plasticizer, and processing time are major variables in polymerization and structure stabilization during the compression molding process of both algal protein biomass containing polyethylene polymer. Chlorella showed better bioplastic behavior than Spirulina microalgae, whereas Spirulina showed better blend performance.

1.2 Literature Review

1.2.1 Algae

Algae are defined as a group of predominantly aquatic, photosynthetic, and nucleus-bearing organisms that lack the true roots, stems, leaves, and specialized multicellular reproductive structures of plants(Smith, 2019). Their photosynthetic pigments are also more varied than those of plants, and their cells have features not found among plants and animals (Robert, 2023). Generally, algae are considered to be aquatic, oxygen-evolving photosynthetic autotrophs that are unicellular, colonial or are constructed of filaments or composed of simple tissues (Guiry, 2012).The number of algal species has been estimated at between one and ten million, most of which are microalgae. The implied biochemical diversity is the basis for many biotechnological and industrial applications. (Gouveia, L., & Oliveira, A. C. 2009).