CHAPTER 1
INTRODUCTION

1.1 Background

Use of suitable growing media or substrates is essential for the production of quality horticultural crops. It directly affects the development and later maintenance of the extensive functional rooting system. A good growing medium would provide sufficient anchorage or support to the plant, serves as a reservoir for nutrients and water, allow oxygen diffusion to the roots and permit gaseous exchange between the roots and atmosphere outside the root substrate[1].

Topsoil is used as a part of growing medium by many nurserymen. It is a non-renewable resource. Increasing utilization of available land for physical and infrastructural development rapidly declines the supply of quality topsoil and thus promoting the utilization of soilless materials in the production of horticultural crops[1].

One of the soilless materials widely available in the tropics is the coconut coir dust or commercially known as cocopeat. Cocopeat is an agricultural by-product obtained after the extraction of fiber from the coconut husk[2].

As a growing medium, cocopeat can be used to produce a number of crop species with acceptable quality in the tropics. Cocopeat is considered as a good growing media component with acceptable pH, electrical conductivity and other chemical attributes[2].

However, cocopeat has been recognized to have high water holding capacity which causes poor air-water relationship, leading to low aeration within the medium, thus affecting the oxygen diffusion to the roots. Physical properties of cocopeat are highly dependent on it processing technique and handling and the air capacity and water retention of the material may vary from 11-53 and from 50-81% respectively.

Briquetting is the most known and widely spread technology of materials compacting. The technology uses mechanical properties of materials to compress

them into a compact shape (briquettes) without the usage of additives or binders in the high-pressure compacting process. Briquetting is mostly used for compacting of biomass.

Briquetting is executed by briquette presses. The material is pressed into the pressing chamber with compacting pressure and pressing temperature. For briquette quality control, the physical parameters, such as density, moisture content, and compressive strength, were found to be the best indicators of the quality[3].

Make the cocopeat into briquette form, proven to be an effective method to increasing the cocopeat performance. In fact, apart from the moisture contained in coco peat briquette products, the coco peat briquette quality is also determined by the strength of that products in restraining the impact loads or compression loads when the product is distributed or transported. The number of cocopeat products that are broken or destroyed in the package during a trip distribution to the consumer, would inflict a financial loss of the manufacturer. This indicates that the parameter level of mechanical strength of the cocopeat product to date less a concern by the manufacturer.

1.2 Objectives

The objectives of this final project as follow:

a. To make and evaluate the coco peat briquette by using Mechanical Thermal Expression Methods.
b. To evaluate the mechanical characteristics of coco peat briquette by using the compression test with Force Gauge Shimpo FGS-50L Vertical Lever and evaluate the impact resistance value of coco peat briquette using the drop test.

1.3 Outcomes

a. By knowing the mechanical characteristics of coco peat briquette, certainly, can give the information and suggestion to cocopeat industry to do the improvement for their product.
b. Impact resistance value of coco peat briquette is important to simulate the forces encountered during emptying of densified products from trucks into ground, or from chutes into bins.

1.4 Problem Scope

The scope of this research is specified on obtained the mechanical properties of briquette using compression test and drop test.

1.5 Writing Systematic

In Chapter I, describes the background, objectives, outcomes, problem scope, and writing systematic. In Chapter II, describes literature for the cocopeat, mechanical properties of briquette theory, then mechanical testing of briquette theory. Then in Chapter III, describes the steps of this research, the figure of equipment tools, and the way to finish this research. In Chapter IV, describes the result of research. In Chapter V, describes the summary of this research.