

# CHAPTER I

## INTRODUCTION

### 1.1 Background

Every year, using of synthetic plastic has become serious problem in Indonesia. Synthetic plastic was used in many application due to its long life and attractive properties [1]. It has good properties such as low density, transparent, and ductile. However, synthetic plastic is not environmentally friendly due to its non-degradable and pollution.

Nowadays, plastic is being substituted by environmentally friendly plastic. Environmentally friendly plastic can be made by PVA material. It is processed by high temperature to become plastic. Generally, PVA has molecular weight of 44.053 g/mol. PVA has good biodegradable, high transparent and good mechanical properties. The commercially good quality of PVA is determined by a high degree of hydrolysis, which is above 98.5%. The degree of hydrolysis and acetate content in the polymer greatly affects its chemical properties, such as PVA solubility and crystallinity.

PVA can provide the better mechanical properties to the composite [2]. PVA is usually used as a matrix for composite material. Many works have been done on the PVA nanocomposites reinforced with cellulose nanofibers [3]. In some research, PVA is treated with reinforcement solution to increase the composite ability and get the more better properties. Lately, several efforts have been focused in using materials from renewable resources for nanocomposite reinforcement [4]. Unfortunately, there is limited information about ultrasonication effect on pure PVA.

In this research, we have done PVA films fabrication with ultrasonication treatment. According to previous report, ultrasonication is able to break the polymer chain of PVA. It can create compact structure and good mechanical properties. Tensile test, moisture absorption, and FTIR were done to investigate the mechanical properties, moisture absorption and functional groups of PVA films.

## 1.2 Problem Formulation

In this research, how the influence of ultrasonication time using ultrasonic cell crusher on mechanical properties and moisture absorption?

## 1.3 Objectives

The purpose of this study is to analyze the influence of ultrasonication time using ultrasonic cell crusher on mechanical properties and moisture absorption.

## 1.4 Benefits

1. To reduce the uses of synthetic plastics
2. To be reference for future research in composite.

## 1.5 Problem Boundary

1. Parameter used is ultrasonication time in ultrasonic process with power 360 watts.
2. The mechanical test performed on the composite is the tensile strength.
3. The PVA that used is PVA 2488.

## 1.6 Writing Systematical

Systematics of writing this research report outline consists of five parts. Chapter I (Introduction) describes about the background problems, objectives, benefits, limitations problems and systematics report writing. Chapter II (Literature Review) describes the basic theory that became the reference of report writing. Chapter III (Methodology) describes the methods undertaken in the study. Chapter IV (Results and Discussion) describes the results of the tests accompanied by analysis and discussion of the results obtained. Chapter V (Conclusion and Recommendations) contains the conclusions obtained from the test results and recommendations for future research.