I. INTRODUCTION

1.1 Background

Waste dump is a problem that needs to be carefully handled because it can adversely affect the quality of the environment and human health. Waste disposal in Padang estimated 1000 tons per day with total accumulated reaches 30,000 tons per month and 365,000 tons per year. This waste consists of household waste, market waste, shop waste and others. Based on the composition of the solid waste test conducted by the Sanitation and Landscaping Agency, the highest percentage of household waste is organic waste that can be composted at 39.8% and the highest percentage in the composition of the market waste is vegetable waste about 90%, and in the shops waste the largest composition of waste is terrace sweep (leaf) waste 49.505% (Dinas Kebersihan & Pertamanan, 2013). Based on these data it is known that most of the pile of waste comes from plants.

Biodegradation process of plant biomass takes a bit long period in nature (Liu et al, 2011). Plant biomass consist a lot of cellulose (Fernandes *et al*, 2011). Plant cell walls have a complex structure consisting of polysaccharides, proteins and lignin. Among the polysaccharides that make up the plants cell walls, cellulose and hemicellulose are the main components (Endler & Staffan, 2011).

Cellulose hydrolysis is a stage of biodegradation (Liu *et al*, 2011). Enzymatic hydrolysis of cellulose is necessary for microorganisms . Although there are so many microorganisms, only a small portion of microorganisms can degrade cellulose, because the cell walls are difficult to degrade. Cellulolytic organisms are very diverse because of their natural substrate depends on plant cell wall structure. Cellulase is different from most other enzymes, because of it ability degrade insoluble substrates (Wilson, 2011).

Naturally in plant cell walls, cellulose is present in the form of microfibrile tissue embedded in other biopolymer matrices such as hemicellulose lignin and pectin. Usually chemical treatment were needed to remove or move other biopolymers besides cellulose, so they can be exposed to hydrolytic enzymes to produce glucose. A group of endo and exocellulase and cellobiase enzymes that work synergistically are needed in hydrolyzing cellulose to glucose where exocellulase enzymes selectively hydrolyze the hydrophobic surface of cellulose. Cellulase known as a class of enzymes, which is produced by fungi and cellulolytic bacteria, which catalyses the hydrolysis of β-1,4-glucosidic bonds makes a connection to glucosil cellulose units (Liu *et al*, 2011).

Soils have enormous microbial diversity, but most are still unexplored (Torsvik & Lise, 2002). Soil microbial communities play an important role in the decomposition and supply of carbon in ecosystems (Heijden *et al*, 2008). Decomposition of simple carbon compounds in forest soils was a complex process, but on cellulose, this process can only be carried out by a small portion of the bacterial community (Lladó *et al*, 2015). Cellulose is one of the main elements of soil carbon. Degradation of plant cellulose in the soil is an important part of the terrestrial carbon cycle (Eichorst & Cheryl, 2012).

The Biological Education and Research Forest located on the western edge of the Barisan Hill as a part of Kamalau Hill, Limau Manis, Padang, West Sumatra (0 '54' S, 100 '28' E) (Rizaldi *et al*, 2018). This forest is an artificial open forest that represents secondary forest (Chairul & Yoneda, 2006). The forest includes lowland tropical rain forest which has an area of ± 150 hectares and is located at an altitude of 250-450 meters above sea level. The south area of this forest bordered by the Limau Manis River, while in the north it is bordered by Batu Busuk Village and in the east it borders the Bukit Rimbo Kamulau range (Putri *et al*, 2013). The Biological Education and Research forest

has a high diversity of animals and plants including several endemic species of Sumatra. Based on previous studies, species richness in the Biological Education and Research forest was estimated at 530 species of trees dominated by the Euphorbiaceae, Moraceae, Fagaceae, and Lauraceae families (Rizaldi *et al*, 2018).

Based on data on the number of plant species in the Biological Education and Research forest there are certainly organisms that can decompose the fallen leaves and the dead trees on the forest floor which common mentioned as leaf litter. Isolation of cellulolytic biodiversity in the Biological Education and Research forest floor can provide a basis for further studies on the use of cellulolytic bacteria as a decomposition of plant organic waste that has cellulose composition.

1 .2 Formulation of the problem

1. Are the isolates bacterial that found from the Biological Education and Research Forest floor have cellulolytic ability?
2. How are the characteristics of cellulolytic bacteria found?

1.3 Research Objectives

The aim of this research is:

1. To find bacteria isolates that have cellulolytic ability from the Biological Education and Research Forest floor.
2. To know the characteristics of cellulolytic bacteria has found.