CHAPTER 1

INTRODUCTION

1.1 Motivation and Statement of Problem

Mushrooms have been regarded as gourmet cuisine across the globe since antiquity for their unique taste and subtle flavor. They are considered as sources of important nutrients including dietary fiber, minerals, and vitamins, in particular, vitamin D (Ren et al., 2012). Recently, they have become increasingly attractive as functional foods due to their potential beneficial effects on human health (Sanchez, 2004). Mushrooms production and consumption is continuously increasing. This lead to an equal amount of mushroom waste (MW) generated as waste by mushroom industry. According to (Moore and Chiu, 2001), mushroom industry produce the largest solid substrate waste in the world. MW contains enough digestible nutrition, primarily decomposed by mushroom that can be reuse. It will increase growers' income and protect environment to recycle MW for feeding livestock or soil for other plants.

Besides, disposed of solid waste material was also major concern. This was because with the increases of mushroom consumption increases the amount of MW generate. Thus, mushroom industries faced problem to find a way to properly dispose of the MW without contaminating the water and soil. At present, dumping were the major means of elimination of MW. However, dumping was not sustainable because of the environmental pollution associated with the disposal method. In fact, the lack of a sustainable waste management solution for MW was the most significant barrier to the future development of the mushroom industry (Finney et al., 2009). Thus, it requires developing new ways to utilize the MW taking into account the adverse impact on environment and health. More attention has been paid to the utilization of this waste in such a way that it becomes a valuable product Apart from the current general use as pesticide residues, enzyme extraction for medicine and other alternative uses of MW like in soil conditioner can be examined.

MW contains high percentage of three primary nutrients; nitrogen (N), phosphorus (P) and potassium (K) (Nitha et al., 2015). Therefore, the MW could be utilized as a bio-fertilizer by analyze the processing factors that increase the N, P and K contents in it. Bio-fertilizers was one of the best innovative tools as a replacement the chemical fertilizers. This approach will provide an alternative outlet for MW because MW contains high source of organic matter and valuable source of major and minor nutrients (Wei et al., 2014). Besides that, the present bio-fertilizer was expensive to buy. Thus, by using MW, it bears the advantage of producing a high quality effluent bio-fertilizer for a reasonable costs and value for money. The main components in bio-fertilizer were the N, P and K.

These N, P and K nutrition most need by plants and soil. This was because plant nutrition one of the most important factors that increase plant production. N is the most recognized in plant for its presence in the structure of the protein molecule. Accordingly, N plays an important role in synthesis of the plant constituents through the action of different enzymes (Khalid et al.,2015). Seeds have the highest concentration of P in a mature plant. P is required in large quantities in young cells, such as shoots and root tips, where metabolism is high and cell division is rapid. P aids in root development, flower initiation, seed and fruit development. P has been shown to reduce disease incidence in some plants and has been found to improve the quality of certain crops (Nyoki et al., 2014). K is an important macro-nutrient and the most abundant cation in higher plants. K has been the target of some researchers mainly because it is essential for enzyme activation (Kumar et al.,2016).

1.2 Objectives

The following are the objectives of this research:

1) To analyze N, P, and K contents in mushroom waste (MW).
2) To analyze the processing factors that affecting the N, P, and K contents in MW.

1.3 Scopes of Study

The scope purpose was as a guideline and vital in order to achieve the objectives. As N, P, and K were the major components in the MW, experiments have been conducted to analyze the N,

P, and K contents in it. In this research, the MW was collected from Rozeriya Enterprise mushroom industry in Kelantan, Kuala Kerai. Then, the sample was analyzed throughout the study for the N, P, and K contents in the laboratory experiments. The chemical components of interest in this study which were N, P, and K was measured by using HACH Spectrophotometer. Total Nitrogen Test, TNT Persulfate Digestion method is being for N content test. Total High range, Molybdovanadate Method with Acid Persulfate Digestion is being used for P content. For K content, Tetraphenylborate Method is being used.

Five independent processing factors were being studied to determine the effect on the N, P and K contents in MW. Five selected factors were aging of waste, waste pH, composition, technique of drying and MW size were the affecting processing factors. The main three nutrients reading were observed after manipulating with the studied factors. These factors have been analyzed via Two Level Factorial Analysis (TLFA). TLFA was conducted using Design-Expert® software (Version 7) based on various factors which was studied. This software was done to discover the most favorable condition and the most significant processing factors that contribute to N, P, and K contents in MW.

1.4 Main contribution of this work

From this research study, the knowledge can be an alternative source for bio-fertilizer using MW. Many researchers have been reported that, when MW was applied in the soil, it helps the host plant grow by obtaining nutrients deep down the soil. However, not many aspects were studied by the researchers in their studies in terms referring N, P, and K contents in MW and processing factor that affect it.

Thus, in order to enhance this study, it is important to study the most contributing factor and the least contributing factor that affect N, P, and K contents in MW. By identifying the most contributing factor, the objective of this research will achieved. Using these factors, other aspects of this research can be studied to enhance the research in the future.