CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The requirement for sustainable freshwater supplies has growth the use of roof-based rainwater storage systems for drinkable functions. Even though rainwater harvesting systems is uncomplicated and cheap to setup, there are many sources of contamination inside storage systems can negatively influence the water characteristic. Environmental factors such as change in season may affect the roof material thus affected the quality of rainwater (Kingett Mitchell, 2003).

Insufficiency of water has become a critical issue due to merger of urbanization, persistent droughts, and unstable weather. Therefore, an alternative solution or action to settle the global increment is by Harvesting Rain Water. However, contamination in harvested rainwater is affected by roof type, including roofing materials, slope, and length (Kingett Mitchell, 2003). Simmons et al. (2001) examined harvested rainwater quality from 125 residential roofs in New Zealand and found that less than 2.4% of the samples exceeded drinking water standards for zinc and copper. The same study showed that 14% of the samples exceeded drinking water standards for lead, which was attributed to the roofs in the study that were coated with lead-based paint. Other studies showed that older roofs leach more metals, suggesting that the age of the roof can negatively impact the quality of harvested rainwater (Chang et al., 2004).

This study was aimed to provide and contribute data on water quality of Rain Water Harvesting based on type of Roof Material.

1.2 Problem Statement

Roof type, including roofing materials, angle, and length affect the impurities in collected rainwater (Kingett Mitchell, 2003). Chemical elements from roofing surface may drain into the collected rainwater due to the acidic characteristic of surrounding rainwater. Airborne pollutants and organic substances such inert solids, dust, leaves, dead insects and bird's wastes, are added to roofs by interception and deposition (Gikas and Tsihrintzis, 2012). A higher temperature types of roofs quicken the process of chemical reaction take place on roof, it also decomposed organic materials that accumulate at the top of roofs (Chang et al., 2004).

1.3 Objectives of the Study

The objectives of this study are to:

1. Study water quality of rainwater harvested on roof material in UMP buildings.

2. Suggest an appropriate water treatment to improve quality of harvested rainwater

1.4 Scope of the Study

The aim of this study is to conduct laboratory tests of water quality of rainwater harvested on roof material in UMP buildings and suggest an appropriate water treatment to improve quality of harvested rainwater. Three different roof types were investigated, which is Clay roof, Metal deck roof and Concrete flat roof and Ambient rainwater as a control sample. Rainwater sample was collected in 3 different rain events. Water quality in this study is determined by doing tests on 9 parameters which is; pH, temperature, conductivity, total suspended solid (TSS), turbidity, nitrate, nitrite, total coliform and Escherichia Coli (E-Coli). First, second and third sample were collected on 11 January 2017, 23 January 2017 and 13 February 2017 respectively.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Rain water collected from rooftop storage can be one of the excellent methods which is ready to use to improving the natural hydrologic cycle and allow city improvement in order to become viable (Kim et al., 2005). The type of roofing surface used and the number of cleansing of the surface influenced the characteristic of the water. Contamination in harvested rainwater is affected by roof type, including roofing materials, slope, and length (Kingett Mitchell, 2003). Due to the acidic nature of ambient rainwater, chemical compounds from roofing materials may leach into the harvested rainwater. Water is our highest valued natural assets but we fail to appreciate it properly. Nowadays, we are extremely realized the important of water to our continuity and their limitation in future. A person need water for their continuity of their life. Earth is covered with about 71% of water. But from all of water in earth, there are only 1% of fresh water and drinkable. (Shaikh Ajim, 2017).

2.2 Rainwater Harvesting

Rainwater harvesting is broadly practice at a domestic level but is progressively being used on a bigger neighbourhood area. Rainwater can contribute an essential alternative of potable water in some condition as well as a beneficial of water for combine with other sources to minimize the levels of impurities.

The growth of established WSPs at the domestic level may not consistently be efficient, but importance of sanitary investigation with easy method is substantial. Well-