

## I. INTRODUCTION

### 1.1 Background

High-fat diet (HFD) has been shown to increase the permeability of epithelial tissue, High-fat diet also functions as a marker of colonic inflammation. Consuming a high-fat diet to a large extent leads to obesity and heart failure which has a systemic effect. High-fat diet also has a major impact on the local gut environment (Teixeira *et al.*, 2011). HFD feeding exacerbates colitis, which is characterized by robust mucosal inflammation and more severe colonic damage (Li *et al.*, 2019).

Dietary fibers which are expected to influence digestive physiology in different ways throughout the gastrointestinal tract (Schroeder *et al.*, 2013). Dietary fiber is originated from the rest of the plant cell walls that are not hydrolyze by human digestive enzymes, including hemicellulose, cellulose, lignin, oligosaccharides, pectin, gum, and mucus (Grooms *et al.*, 2013). Fiber can also induce the production of metabolic hormones in the intestines which will greatly promote energy burning (Liu *et al.*, 2019).

One of the source of dietary fibers is Jicama (*Pachyrhizus erosus*, Family Fabaceae). Jicama is a tuberous plant that is rich in fibers and bioactive substances (Park & Han, 2016). This plant is commonly cultivated in subtropical and tropical areas including Indonesia. Jicama tuber contains various nutrients such as vitamin C, calcium, phosphor, polyphenols, flavonoid, and fibers that are beneficial for the health (Pandey *et al.*, 2015). Jicama fiber can counteract the obesity development induced by HFD. As one of the plausible mechanisms is that fiber could reduce the rate of fat

breakdown through an enzymatic mechanism in the digestive tract (Dhingra *et al.*, 2012). Due to its ability in increasing the viscosity of the food mixture and precluding the secretion of the digestive glands. High viscosity will subsequently promote an apparent reduction of the digestive activity and absorption of fat in the intestines. Consequently, although the amount of fat that enters the digestive tract is high, its absorption is lower so that it will not have a detrimental implications in the body (Zhai *et al.*, 2018). Soluble fiber, such as pectin and some hemicelluloses have the ability to retain water and can form a thick liquid in the digestive tract. Foods rich in fiber will be digested longer in the stomach, then fiber will attract water and give a feeling of fullness longer, preventing from consuming more food. Foods with high crude fiber content usually contain low calories, low sugar and fat content which can help reduce obesity (Han *et al.*, 2015).

In a study conducted by Kumalasari *et al.* (2014) and Park & Han (2015) stated that the benefits of this jicama fiber can increase insulin sensitivity, act as an immunomodulator and prevent platelet aggregation. Fiber in the digestive tract can help improve the performance of digestive enzymes. However, research on the effect of jicama fiber on colon histopathology fed a high-fat diet is still limited. As well as the effect of yam fiber on water content in the feces of mice fed a high-fat diet still needs to be explained. Therefore, a study was conducted on the effect of jicama fiber on fecal water content and histopathology of colon in mice fed with high-fat diet.

## **1.2 Problem formulation**

1. How does the effect of jicama fiber on fecal water content of mice fed with HFD?
2. How does the effect of jicama fiber on the histopathology of colon in mice fed with HFD?

## **1.3 Research objectives**

1. To analyze the effects of jicama fiber on fecal water content of mice fed with HFD.
2. To analyze the effects of jicama fiber on the histopathology of colon in mice fed with HFD.

## **1.4 Significance of the research**

The significance of this research is to expand scientific information concerning the beneficial effects of dietary fiber in obesity caused by high-fat diet (HFD).

