

# CHAPTER I

## INTRODUCTION

### 1.1. Background of Research

World Health Organization (WHO) has stated that hypertension is one of the Non-Communicable Diseases (NCD) which has become a cause of death in several developed countries in the world (Steddon et al., 2014). Central of Disease Control and Prevention (CDC) has called hypertension as the silent killer because there is no specific signs and symptoms (CDC, 2018). WHO data has stated that Africa is the highest prevalence of hypertension in the world with 46%, both male and female (WHO, 2016). Indonesia is a country with 25-30% of hypertension case in 2000 and decreased to 20-25% in 2010 (Mills et al., 2016).

According to Basic Health Research of Indonesia (RISKESDAS), hypertension is the highest ranking among NCD with 31.7% of prevalence in 2007 and decreased to 25.8% in 2013 (Ministry of Health, 2013a). However, according to RISKESDAS data, hypertension prevalence has increased from 25.8% in 2013 to 34.1% in 2018 (Ministry of Health, 2018a). South Borneo is the highest prevalence of hypertension in Indonesia with 44.1% (Ministry of Health, 2018b).

Reducing salt intake, increasing consumption of vegetables and fruits as a source of potassium and antioxidants is one method for controlling blood pressure (Mahan et al., 2012). The antioxidant content in fruits and vegetables as natural antihypertensive has played an essential role in reducing oxidative stress due to free radicals and improving endothelial cell function through the production of Nitric Oxide (NO) (Mulyani, 2015). The use of natural antihypertensive from fruits and vegetables is one of the considerations to reduce the side effect of long-term use of synthetic drugs (Balasuriya et al., 2011).

Goldenberry and cucumber are natural food ingredients to be used as antihypertensive food. Giving 100 g of cucumber juice to hypertensive patients has reduced systolic and diastolic blood pressure for seven days of treatment significantly (Purbosari, 2014). Potassium has triggered the dilatation mechanism to lowering blood pressure through Nitric Oxide production, enlarging the size of an endothelial cell, increasing sodium and water excretion through inhibition of renin production (Houston, 2011). The inhibition of renin has prevented the formation of angiotensin I and angiotensin II, and reduced the sensitivity of vasoconstriction (Steddon et al., 2014).

Goldenberry fruit has potential as an immunomodulator and antioxidant effect (Dewi et al., 2018). Antioxidant-rich plants have the potential impact on hypertension and some cardiovascular diseases to reduce oxidative stress, inhibit ACE, relax vascular endothelial cells and regulate cells signaling in the body (Balasuriya, 2011). However, based on previous research, the study of goldenberry fruits for hypertension both on hypertensive rats or human has never been done before. Some research journal article has discussed the potential of goldenberry as antidiabetic and anticancer in rats subject. Therefore, there is a need to examine the effect of goldenberry fruit combined with cucumber to reduce blood pressure in hypertensive rats.

A halal food product has become a crucial thing because halal food is a source of blessing that brings many benefits to consumers. *Rasulullah Sallallahu 'Alaihi Wa Sallam* said that health is one of the human rights and in accordance with human nature. According to *Hadeeth* Islam has emphasized the need for *istiqomah* in maintaining health by living a healthy lifestyle (Sawari et al., 2015). The present study is conducted to analyze the effect of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) juice as halal beverage against hypertensive rats.

## 1.2. Statement of Problem

1. Does goldenberry (*Physalis peruviana L.*) juice as halal beverage affect hypertensive rats?
2. Does cucumber (*Cucumis sativus L.*) juice as halal beverage affect hypertensive rats?
3. Does a combination of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) juice as halal beverage affect hypertensive rats?
4. Which one is the most effective combination of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) juice on hypertensive rats?
5. Is there any halal critical point in the making process of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) juice as the halal beverage against hypertensive rats?

## 1.3. Objective Research

### 1.3.1. General Objective

Determining the effect of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) juice as halal beverages against hypertensive rats.

### 1.3.2. Specific Objective

1. Analyzing the effect of goldenberry (*Physalis peruviana L.*) juice as a halal beverage against hypertensive rats.
2. Analyzing the effect of cucumber (*Cucumis sativus L.*) juice as a halal beverage against hypertensive rats.
3. Analyzing the effect of goldenberry and cucumber combination juice as a halal beverage against hypertensive rats.
4. Analyzing the most effective combination of goldenberry (*Physalis peruviana L.*) and cucumber (*Cucumis sativus L.*) against hypertensive rats.

5. Analyzing the halal critical point of goldenberry and cucumber juice as halal beverages against hypertensive rats.

#### **1.4. Benefit of Research**

##### **1.4.1. Benefit for the Community**

Providing information to the public about the benefits of goldenberry and cucumber juice as a natural food source that is beneficial to health.

##### **1.4.2. Benefit for the Institution**

Enriching scientific studies on the use of food sources that can improve health and nutrition, especially for hypertensive patients.

##### **1.4.3. Benefit for the Researcher**

1. Improving the knowledge about benefits of combination goldenberry and cucumber juice
2. Improving the ability of researchers to conduct experimental studies in animals.

#### **1.5. Authenticity of research**

The authenticity includes the research title, the name of the researcher, year and place of the study, a design of the study, variables, results, and differences in the study. Several studies have been conducted on the effect of cucumber on hypertension and goldenberry extract on hypercholesterolemic and diabetic rats. However, the effect of combination juice of goldenberry (*Physalis peruviana L.*), and cucumber (*Cucumis sativus L.*) as halal beverages on reducing blood pressure in hypertensive rats strain *Sprague Dawley* induced by sodium chloride 8% (NaCl) has never been done before.

**Table 1.1. Authenticity of Research**

| No | Research title  | Design  | Results   | Different in Research   |
|----|---|---|---|---|
| 1  | <i>Physalis peruviana</i> Linn. Fruit Extract Improves Insulin Sensitivity And Ameliorates Hyperglycemia in High Fat Diet Low Dose STZ-induced type 2 Diabetic Rats | True experimental with control group pre-post test        | The induction of goldenberry extract has significantly affected insulin sensitivity and ameliorates in mice | The induction of goldenberry extract aims to determine the effect of increasing insulin sensitivity and ameliorates |
|    | (Sathyadevi <i>et al.</i> , 2014)   |   |   |   |
| 2  | Potency of Cape Gooseberry ( <i>Physalis peruviana</i> ) Juice in Improving Antioxidant and Adiponectin Level of High Fat Diet Streptozotocin Rat Model             | True experimental with control group pre-post test design | The induction of goldenberry juice has significantly increased antioxidant and adiponectin level in rats    | The induction of goldenberry juice aims to determine the effect of increased antioxidant and adiponectin levels     |
|    | (Dewi <i>et al.</i> , 2018)   |   |   |   |
| 3  | The Effect of Cucumber ( <i>Cucumis sativus</i> L.) on Systolic and Diastolic Blood Pressure in Hypertensive Patients   | True experimental with control group pre-post test design | Cucumber juice 150 ml can reduce blood pressure   | Without a combination of cucumber and goldenberry. The dependent variable is hypertensive patient                   |
|    | (Lebalado, 2014)  |   |   |   |

| No | Research title  | Design  | Results                                  | Different in Research   |
|----|---|---|--|---|
| 4  | The effectiveness of Cucumber Juice Consumption on Decreasing Blood Pressure in Hypertensive Patients<br><br>(Kharisna, <i>et al.</i> , 2012) | Quasy experiment with Non-equivalent control group. | Cucumber juice can reduce blood pressure | Without a combination of cucumber and goldenberry.<br>With quasi-experimental study<br>The dependent variable is hypertensive patient |