CHAPTER 1

INTRODUCTION

1.1 Background

Indonesia has now ranked fourth in the number of diabetics after the United States, China, and India. Based on data from the central body statistics or in Indonesia called Badan Pusat Statistik (BPS), the number of diabetics in 2003 as many as 13.7 million people and based on population growth patterns it was estimated that in 2030 there will be 20.1 million people with diabetes. According to WHO predicts an increase in people diabetes in Indonesia in 2030 will reach around 21.3 million people (Pdpersi, 2014).

Based on IDF statistical reports there are 230 million diabetics with some events that are up 3% or 7 million people every year. ADA reports that every 21 seconds there is one person who has diabetes. It is estimated that there are 350 million in the year 2025, more than half are in Asia, mainly in India, China, Pakistan and Indonesia (Tandra, 2014).

According to the results of Riskesdas (2018), the prevalence of Diabetes Mellitus (DM) based on blood tests on the population aged ≥15 years was 8.5% higher than in 2013 was 6.9%. The prevalence of DM based on a doctor's diagnosis in the age population ≥15 years by province in 2018 reached 3.4% higher when compared in 2013, with a value of 1.5%.

DM treatment is a treatment for a long period and a lifetime. DM treatment such as the use of insulin and oral antihyperglycemic drugs which are relatively expensive. They also requires a long period of time and can cause unwanted side effects (Hussain and Marouf, 2013).

Chronic hyperglycemia will increase the production of free radicals and oxidative stress. In oxidative stress, there is an imbalance between free radicals and antioxidants, so the cell is in an excessive state of oxygen. Antioxidants function to fight free radicals caused by hyperglycemia conditions (Erujuwa, 2010).

One of the candidate plants that must be taken into account in their antioxidant abilities is sarang semut extract *(Myrmecodia Pendens)* (Kurniawati & Sianturi, 2016). Study of Jelly & Makiyah (2011) showed that infusion Sarang semut *(Hydnophytum formicarum)* can increase the diameter and number of ß cells of the islets of Langerhans in rats induced by alloxan L30 mg/ kgBW. Sarang semut dose 5.04 g/kgBw can increase the size of the diameter of the islets of Langerhans significantly from (33.46 t 12.38) pm become (62.2 t 15.88) pm. besides, H. formicarum 5.04 g/kg Bw able to increase significantly the number of p cells of (L4.4 x 5.01) to (34.6 t 3.81). So Sarang semut shown to reduce damage to the pancreas.

And a source of antioxidants that can affect diabetes reduction is cinnamon. Cinnamon *(Cinnamomum burmanii)* is a food source of antioxidant. (Qin *et al.,*2010). The usefulness of this cinnamon plant can be a drug for gout, high blood pressure, ulcers, hermia, asthma, mouth sores, difficult defecation and diabetes mellitus (Syarif *et al.,* 2015).

Islam teaches us about medicine by using natural materials, especially plants, that have long been known by Allah SWT not creating everything in vain. All that Allah created in advance it has the benefit of each one, including plants. Besides as food, plants can also be used as medicine.

As the word of Allah SWT in QS.Asy-Syu'ara / 26: 7)

أَوَ لَمۡ يَرَوۡاْ إِلَى ٱلۡأَرۡضِ كَمۡ أَنۢبَتۡنَا فِيهَا مِن كُلِّ زَوۡجٖ كَرِيمٍ (٧)

Do they not see the earth, how many of every noble kind we have caused to grow in it?

From the above verse, it can be understood that Allah SWT always give signals to humans to develop and expand knowledge, especially science that discusses drugs that come from nature, good from plants, animals, and minerals. Where all three have been explained in the contains a substance/ drug that is used to cure humans of disease, even though not all plants were created by Allah SWT on earth can cure certain diseases.

1.2 Problem Formulation

Based on the background above the formulation of the problem in the study are:

Is there an effect on the sarang semut (*Myrmecodia pendans)* herbal drink with cinnamon powderagainst blood glucose in *Sprague Dawley* rats with type 2 Diabetes Mellitus ?

1.3 Purpose

1.3.1 General Purpose

Knowing the effect of sarang semut (*Myrmecodia pendans*) herbal drink withcinnamon powderagainst blood glucose in *sprague dawley* rat with type 2 diabetes mellitus

1.3.2 Special Purpose

a. Analyzing of the effect of sarang semut *(Myrmecodia pendans)* herbal drink with cinnamon powder against blood glucose before and after treatment
b. Analyzing the best formula for decreasing of blood glucose

1.4 Research Benefits

1.4.1 Benefits for the Community

This research is expected to be used as reading material and to broaden scientific horizons so that people can cultivate plants that grow in Indonesia a product that is beneficial for the health of our bodies

1.4.2 Benefit for the Institution

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

1.4.3 Benefit for the Researcher

1. Increase the knowledge about benefits of combination sarang semut herbal drink and cinnamon powder

2. Increasing the ability of researchers to conduct experimental studies in animals.

1.5 Authenticity of Research

Here are some studies related to this research:

Table 1. Authenticity of Research

Research Title, Researcher's name, Year	Research methodology	Result	Difference
Pengaruh penambahan kayu manis terhadap antioksidan dan kadar gula total minuman fungsional secang dan daun stevia sebagai alternatif minuman bagi penderita Diabetes Melitus Tipe 2 (Hastuti, 2014)	Experimental research with random designs Independent : the addition of cinnamon to antioxidants and the total sugar content of the secang and stevia leaf functional drinks Dependent : Type 2 Diabetes Mellitus sufferers	The results of this study was in the addition of wood sweet can raise pH of functional drinks P = (0.000)	Independent variable : Sarang semut herbal drink Sample : Rat Sprague Dawley
Efektifitas ekstrak umbi sarang semut (*myrmecoddia pendens merr.&perry)* sebagai penurun kadar glukosa darah tikus sprague dawley yang diabetes mellitus (Raya*et al.,* 2016)	True field experiment nutrition with the pre approach and posts randomized controlled group design Independent : Effectiveness of ant nest tuber extract (myrmecoddia pendens merr. & Perry) Dependent : sprague dawley rats with diabetes mellitus	Results research stated that sarang semut extract which contains tannin able to bring down blood glucose level induced mice alloxan P = (0.001)	Independent variable : sarang semut herbal drink with cinnamon Powder

Research Title, Researcher's name, Year	Research methodology	Result	Difference
Pengaruh Pemberian seduhan bubuk kayu manis *(cinnamomum zeylanicum*)terhadap kadar glukosa puasa 2 jam post prandial pada penderita diabetes melitus tipe 2 (Arini & Ardiaria, 2016)	True field experiment nutrition with the pre approach and post randomized controlled group design Independent : Effects of administration of cinnamon powder (cinnamomum zeylanicum) Dependent : Type 2 diabetes mellitus sufferers	Results research stated that steeping wood powder sweet could bring down content blood glucose on diabetics type 2 P = (0.001)	Independent variable : Sarang semut herbal drink Sample : Rat Sprague Dawley
Pengaruh penambahan pandan wangi dan kayu manis pada teh herbal kulit salak bagi penderita diabetes (Anjani *et al.,* 2015)	Random Group Design (RGD) consists of 2 factors, each factor consists of 3 levels. Independent : Effect of addition of fragrant pandanus and cinnamon on salak bark herbal tea Dependent : diabetics	The addition filtrate fragrant pandanus and filtrate cinnamon gave influence on total phenol, activity antioxidant, pH and color produced in herbal tea products snake skin. P = (0.006)	Independent variable : Sarang semut herbal drink Sample : Rat Sprague Dawley