

CHAPTER 1

INTRODUCTION

1.1. Background of Research

There has been a shift in the pattern of diseases between communicable diseases and non-communicable diseases, such as diabetes mellitus, cancer, stroke, heart disease, chronic obstructive pulmonary disease (COPD), etc due to lifestyle changes, increasing economics and social status known as epidemiological transitions (Wahyuni *et al.*, 2013). Diabetes mellitus is a disorder of homeostatic nutrient that occurs due to pancreatic dysfunction or an abnormal response from cells targeted to the hormone insulin (David & Dolores, 2007). People with diabetes mellitus increase from 108 million in 1980 to 422 million in 2014 (WHO, 2016). Global prevalence in 2014, 8,5% of adults aged 18 years and over suffered from diabetes mellitus. In 2016, diabetes mellitus was the direct cause of 1,6 million death and in 2012 high blood glucose was another 2,2 million cause of death (WHO, 2018).

According to the Data and Information Center at 2016 showed that non-communicable diseases were the cause of death in the world which has a percentage of 70% (Profil Kesehatan Indonesia, 2016). According to the ministry of health based on basic health research data for the year 2018 the prevalence of diabetes mellitus in the population aged of ≥ 15 years in Indonesia was 10.9% (Ministry of Health, 2018).

According to the Ministry of Health's Data and Information Center in 2014, the proportion of diabetes mellitus in Indonesia amounted to 6.9% in the Indonesian population aged 15 years and over which was estimated at 176,689,336 people and 0.6% of Indonesia's population aged 15 years and above or around 1 million people actually feel the symptoms of diabetes mellitus but have not been examined and are confirmed to have diabetes mellitus (Ministry of Health, 2014).

Patients with diabetes mellitus find many effects are not expected, therefore begin to look at alternative medicine by utilizing plants or natural ingredients to reduce blood sugar levels with little or no side effects. Allah has created this realm for humans with various medicinal properties, and this is a gift from Allah SWT that must be utilized and studied as mentioned in Al-Qur'an Surah As-Syu'ara (42) 7-8:

أَوَلَمْ يَرَوْا إِلَى الْأَرْضِ كَمْ أَنْبَتْنَا فِيهَا مِنْ كُلِّ زَوْجٍ كَرِيمٍ ، إِنَّ فِي ذَلِكَ لَآيَةً وَمَا كَانَ أَكْثَرُهُمْ مُؤْمِنِينَ

“Do they not look at the earth, how many noble things of all kinds We have produced therein?. Verily, in this is a Sign: but most of them do not believe.”

Indonesia's people is currently utilizing many different types of plants as medicine not only to treat various diseases but also to maintain health as well. Types of herbs that are used as medicine are often referred to as herbal medicines. One of the plants that can be used as medicine is zalacca (Haryoto & Priyatno, 2018). Usually many people consume flesh of zalacca fruit and dispose of their rind even though is very nutritious. Zalacca rind is usually used as waste that cannot be used again, but the zalacca rind contains very high nutritional value.

According to Kanon *et al.* (2012) the zalacca rind can reduce blood sugar levels because it contains flavonoids. Pterostillbene is a compound contained in the zalacca rind which acts as an anti-diabetic and reducing blood sugar levels (Sahputra, 2008). According to Kanon *et al.* (2012) zalacca rind extracts have an effect on reducing blood sugar levels of male white wistar rats induced by sucrose. In the research of Suarsana (2009) stated that flavonoids can reduce blood sugar levels in rats by stimulating β -pancreatic cells to produce more insulin. In a study by Widyaningsih and Andrianty (2014) stated that the treatment of administration of herbal tea with the zalacca rind can affect the decrease in blood glucose sugar levels reaching 54.43%. In the research of Evacuasiany *et al.* (2014) stated that

the zalacca rind extract reduced blood glucose levels in rats comparable to glibenclamide by Oral Glucose Tolerance Test (OGTT).

The zalacca rind used as an alternative to reduce blood sugar levels. During this time the community is not aware of the content contained in the zalacca rind. The community thinks that the zalacca rind is rubbish but the zalacca rind can be used as an alternative treatment.

1.2. Formulation of the Research Problem

How effectivity test of zalacca (*Salacca zalacca* [Gaertner] Voss) rind extract on blood sugar level of diabetic white wistar rats (*Rattus norvegicus L.*)?

1.3. Objectives Research

1.3.1. General Objective

To know effectivity test of zalacca (*Salacca zalacca* [Gaertner] Voss) rind extract on blood sugar level of diabetic white wistar (*Rattus norvegicus L.*)

1.3.2. Specific Objectives

1. Knowing the effectiveness of zalacca rind extract against blood sugar levels at a dosage of 0.075 g / 200 gW
2. Knowing the effectiveness of zalacca rind extract against blood sugar levels at a dosage of 0.15 g / 200 gW
3. Knowing the effectiveness of zalacca rind extract against blood sugar levels at a dosage of 0.225 g / 200 gW

1.4. Benefits of Research

1.4.1. Benefit for Researchers

Can provide new insights for diabetes researchers to reduce blood sugar levels by utilizing the zalacca rind as an alternative treatment.

1.4.2. Benefit for Institutions

Can provide scientific information that is useful for the development of science. Besides that, it can be a reference for further research.

1.4.3. Benefit for the Community

Providing information to the public about the benefits of zalacca rind extract as an alternative treatment for people with diabetes mellitus.

1.5. Authenticity of the Research

Table 1. Authenticity of the Research

Researchers	Title	Variable	Results	Difference
Kanon, M. Q., Fatimawali dan Widdhi, B (2012)	Effectivity Test of Salacca (<i>Salacca zalacca</i> [Gaertn] Voss) Rind Extract on Blood Sugar Level Decrease of White Male Wistar (<i>Rattus norvegicus L.</i>) Induced with Sucrose	Independent variable: extract of zalacca rind Dependent variable: blood sugar levels of male white rats	The salacca rind extract has an effect on the decrease in blood sugar levels of male white rats of tourist lines induced by sucrose	Discusses about male white rats induced by sucrose

Researchers	Title	Variable	Results	Difference
Ega Purnamasari, Ega, Eti Yerizel, Efrida (2014)	Effect of Giving Aspartame on Blood Glucose Levels of Alloxan-Induced Diabetes Rats	Independent variable: giving aspartame Dependent variable: blood glucose levels of diabetic diabetes mellitus induced by alloxan	Giving aspartame affects the decrease in blood glucose levels induced by alloxan	Discuss about giving aspartame to rat blood glucose
Endang Evacuasiany, Pinandojo Djojosoewarno, I Putu Gede Darma Eka Putra (2014)	The Effect of Salacca (<i>Salacca</i> <i>zalacca</i>) Rind Extract on Blood Sugar Level of White Swiss Webster Male Rats (<i>Mus</i> <i>musculus</i>) With Oral Glucose Tolerance Test	Independent variable: extract of the salacca rind Dependent variable: blood sugar levels in rats	The salacca rind extract lowers blood glucose levels in rats comparable to glibenclamide by Oral Glucose Tolerance Test (OGTT)	Discussing about the salacca rind extract extracts lower blood glucose levels with an oral glucose tolerance test

Researchers	Title	Variable	Results	Difference
Muhtadi. Eni Setyowati, Tanti Azizah (2012)	Antidiabetic Activity of Melitus of Sweet Orange Fruit Extract (Citrus sinensis) and Kelengkeng Fruit Rind (Euphoria longan (Lour.) Steud) Against Male White Rats Wistar Line Induced by Alloxan.	Independent variable: extract of sweet orange peel and kelengkeng fruit rind Dependent variable: antidiabetic activity	Sweet orange peel extract and kelengkeng fruit rind can reduce blood glucose levels in diabetic rats induced by alloxan	Discusses about sweet orange peel extract and kelengkeng fruit peel against rats induced by alloxan