CHAPTER I

INTRODUCTION

1.1. Background

Acne vulgaris acne is a skin disease chronic, obstructive and inflammation of the pilosebaceous unit that often occurs in adolescence. The prevalence of acne in adolescence is quite high, ranging between 47-90% during adolescence (Kurokawa et al., 2009). The disease is confined to the follicle polisebase heads and upper bodies because pilosebase glands in this area are very active. If pilosebase follicles are clogged, the sebum cannot get out and when collected in the follicle it becomes swollen, as well as there was the beginning of blackheads as a form of acne (Tranggono & Latifah, 2007). More over, other factors that cause blockage of the follicles are *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Propionibacterium acnes* are bacteria that cause acne (Ayu, 2009).

Acne treatment is given with antibiotics such as tetracycline, erythromycin, doxycycline, and clindamycin. The medication used benzoyl peroxide, azelaic acid, and retinoids (Oprica, 2004). The use of antibiotics for treating disease caused by a bacterial infection can lead to problems associated with the toxic effects of drugs, drug residues, and the development of resistant microbes. Judging from these problems, it is necessary that alternative medicine is more effective, efficient, and have minimal side effects (Monica et al., 2013).

Indonesia has many types of plants that can be used as traditional medicine (Miksusanti et al., 2009). Most people prefer their treatment options for medications from nature. Natural materials currently used in the treatment are more prevalent because the natural materials are considered to have lower side effects than synthetic drugs or chemicals, are more affordable and are easily available raw materials (Muhlisah, 2000). According to the resolution on Promoting the Role of Traditional Medicine

in Health Systems: Strategy for the African Region, about 80% of people in the member countries of the World Health Organization (WHO) in Africa already use traditional medicine for primary health purposes (DitjenPEN, 2014). Thus, the researcher must create an alternative treatment that can be used to treat diseases without the use of ingredients that are prohibited by Allah SWT. One alternative is to use herbal or natural materials. Natural materials are created by Allah SWT. it can be adapted to become the drugs of various diseases. Science all the diseases exist, God must have created a cure. As word of the Prophet Muhammad SAW:

مَا أَنْزَلَ اللهُ دَاءً إِلَّا أَنْزَلَ لَهُ شِفَاءً

> Meaning: «Allah has sent down a disease except lowering drugs for him» (HR. Ibnu Majah-3430).

The *Hadith* explains that God created all definite disease and its cure. Illness to humans comes from Allah, then Allah reason that He will provide a cure for the disease (Wulandari, 2017). God has created a whole spectrum of natural resources on earth for humans to use in their life, especially in medicine. The *Hadith* can be understood that as human beings, especially the scientists we have to take advantage of the abundant natural resources from God which can be used by the humans without having to use ingredients that are prohibited by the Creator of the disease.

Lots of efficacious natural ingredients have been formulated and have a positive effect on the inhibition of the growth of acne-causing bacteria, such as ginger rhizome (Fissy et al., 2014), narcissus bulbs (Yuni et al., 2013), star fruit (Ikhsanudin & Mardhiyah, 2017), *Excoecaria agallocha* leaves (Borman et al., 2015), soma leaves (Seli et al., 2015), paria (Laianto, 2014), lemongrass leaves (Sarlina et al., 2017), and cherry leaves (Handayani, 2014). The researcher chose cherry because these natural resources are very abundant and easy to obtain. Many natural materials will facilitate the production of large quantities.

Cherry (*Muntingia calabura* L.) is a tropical plant that is used as a shade plant. According to Sami et al. (2017), cherry leaves compounds are phenolic, flavonoids, and saponins which have strong antioxidant activity. According to a research by Putri (2016), cherry leaves extract can be used as an alternative to synthetic pesticides. Investigated also by Handy & Sentat (2016) on cherry leaves extract, it also has potential as a treatment for burns and also investigated by Heinrich et al. (2009) that the active ingredients in a cherry plant are flavonoid, sesquiterpenoid, and furan derivatives. Cherry leaves have many conscientious and effective as an anti-bacterial (Wulandari, 2017), (Handayani, 2014), (Arum et al., 2012). Other studies have also known that the cherry leaves have the potential to counteract the free radicals as exogenous antioxidants (Devi et al., 2016), (Sami et al., 2017), (Nurhasanah, 2012).

The gel dosage form is better to use in the treatment of acne because preparations of gel with a polar solvent is more easily cleaned from the surface of the skin after use and do not contain oils that can increase the severity of acne (Sasanti et al., 2006). One development in the treatment gel formulation is in the form of a spray (spray gel). This form has the advantage of another dosage form for delivering a substance into place without any irritation through contact with a cotton swab to minimize waste, reduce the possibility of contamination or infection and trauma to the patient. Furthermore, topical preparations by spray techniques are preferred over topical ointments or gels, especially for skin irritation (Jauregui et al., 2009).

In relation to the abundance in cherry leaves especially antibacterial activity, making researchers interested in testing the antibacterial effectiveness of the ethanol extract of cherry leaves (*Muntingia calabura* L.) which are formulated into a spray gel preparation against acne-causing bacteria such as *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Propionibacterium acnes.*

1.2. Formulation of the Problem

Based on the above background, the problem can be formulated as follows:

1. Can the spray gel preparation of ethanol extract of cherry leaves inhibit the growth of *Staphylococcus aureus, Staphylococcus epidermidis,* and *Propionibacterium acnes*?
2. How is the antibacterial activity from spray gel of ethanol extract from leaves of cherry (*Muntingia calabura* L.) against *Staphylococcus aureus*, *Staphylococcus epidermidis,* and *Propionibacterium acnes*?
3. Which bacteria has the most effective growth inhibited by the spray gel of ethanolic extract from cherry leaves?

1.3. Objectives of Research

1. To know whether the spray gel of ethanolic extract from cheery leaves preparation can inhibit the growth of *Staphylococcus aureus, Staphylococcus epidermidis*, and *Propionibacterium acnes*.
2. To Know the antibacterial activity from spray gel of ethanol extract of cherry leaves (*Muntingia calabura* L.) with a variety of compositions against *Staphylococcus aureus*, *Staphylococcus epidermidis,* and *Propionibacterium acnes*.
3. To find out which bacteria has the most effective growth inhibited by a gel of ethanolic extract from cherry leaves spray

1.4. Significance of Research

1.4.1. Theoretical Significance

The results of this study are expected to inform the public about the efficacy of the spray gel formulation containing ethanol extract of cherry leaves in inhibiting the growth of *Staphylococcus aureus*, *Staphylococcus epidermidis,* and *Propionibacterium acnes* as bacteria that cause acne.

1.4.2. Practical Significance

- The results of this study will be expected to add insight and knowledge in the field of health especially on the spray gel formulation with active ingredients from natural substances to inhibit the growth of *Staphylococcus aureus*, *Staphylococcus epidermidis,* and *Propionibacterium acnes.*
- To serve as the reference for the development of pharmaceutical preparations by spray gel system as an antimicrobial substance.