

# CHAPTER I

## INTRODUCTION

### 0.1 Background of Research

Indonesia is tropical country, which causes this country to be rich in various types of plant, besides ancestral heritage can process medicines from the nature that is efficacious to cure a disease. According to Indonesian plant commodities, 20% of 1.045 tribes in Indonesia have made and consume of 1.200 Indonesian plant species used herbal medicine. Recently, the lifestyle of back to nature by using up the herbal research ingredients have improved for curing the various diseases (Salim, 2017). According to Bureau central statistic 2014, the exports of herbal medicine for the 2009-2013 period had increased till 6,49%. God created human as caliph to think, process, and research everything in this world to be used for human being, no exception in herbal medicines research. Al-qur'an mention An-nahl verse 11:

يُنْبِتُ لَكُمْ بِهِ الزَّرْعَ وَالزَّيْتُونَ وَالنَّخِيلَ وَالْأَعْنَابَ وَمِنْ كُلِّ الثَّمَرَاتِ ۗ إِنَّ فِي ذَلِكَ  
لَآيَةً لِّقَوْمٍ يَتَفَكَّرُونَ

Mean:

*He grows for you with rain, plants; olives, dates, grapes and all kinds of fruits. Verily in that there is truly a sign (power of God) for those who think..*

One of the plants that can be used for treatment is cherry (*Muntingia calabura L*). Cherry is neotropic plant that grows well in tropical countries, it has high rainfall and sunshine full a year, so get the good of photosynthesis process (Rizky, 2017; Charina, 2016). According to Mettaswari (2017), the lack of knowledge of cherries benefit, make it less utilization in Indonesia. Cherry also widely grown on the roadside and edges of drain water as well

as less conducive places to plant life because it has good adaptation from surrounding (Puspitasari, 2016; Manik, 2014).

Kersen fruit has anti-inflammatory and antioxidant activities while kersen leaves have antibacterial, antioxidant, antiproliferative and antihyperglycemic activity (Shindhe, 2013). On the research of Ratnasari (2017), ethanol extract of cherry leaves contains alkaloids, flavonoids, saponins, tannins, and these terpenoids, steroid are effective as antibacterial of *Staphylococcus aureus* and *Escherichia coli*. Flavonoid compound of cherry leaves has antibacterial, anti-inflammatory, antiallergic and antithrombotic activity. It can inhibit of DNA gyrase, so that bacteria are unable to replicate due to polarity differences between lipid constituent of DNA and alcoholic cluster compounds of flavonoids which cause damage .to the structure DNA lipid and bacteria will experience the lysis

Acne vulgaris is chronic obstructive and inflammatory skin disease in pilosebaceous which are adolescent characterize, hence the appearance of blackheads, papules, pustules, and nodules (Movita, 2013). Based on the record of Indonesian cosmetics dermatology study, the prevalence of Indonesian acne sufferers from 2006 reached 60% and 80% to 2007. Four features of acne vulgaris pathogenesis is epidermis hyperproliferation, follicular, over production of sebum and the presence of *Propionibacterium acnes* (*P.acnes*) bacteria. *Propionibacterium acnes* is one of the positive gram bacteria that can break down the length triglycerides for healing fatty acid. It rises the *P.acnes* which can cause inflammatory and acne. According to Wasitaatmadjas research (1997) that bacteria of *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Staphylococcus aureus* play a crucial . role in acne inflammation are.s

Neomycin, erythromycin, doxycycline and clindamycin and benzoyl peroxide usually used for acne treatment but they have side effects such as irritation, resistance, immuno-hypersensitivity organ damage and tract infection in long term use (Saraswati, 2015; Rizky, 2017; Aziz, 2010;

Baumann, 2009). Therefore, drug using in natural ingredients are preferred because of relatively safe. Setiawan et al (2017), entitled the development of gel preparation product combination of soursop leaf extract and cherry leaves to extract to inhibit *Propionibacterium acnes* as acne stated that had the activity of bacteria used in combination 5%:10% and inhibitory power .is 0,5 cm.for ethanol extract of cherry leaves

Development of pharmaceutical preparation innovation especially for topical preparation is rising, like ointments, cream gel to film-forming polymers that can penetrate the skin. Gel preparation is being able to deliver system of the skin, increasing local bioavailability, low dose, simple formulation and convenient to use. One of the gel preparation development is spraying gel preparation which can reduce microorganism contamination of hand in use, more extensive drug contact and more elegantly and efficiently preparation. According to Fitriansyah et al (2016) research, the utilization of polymers as film-forming to bandage and treat the wound being intensively, and the critical thing from spray gel preparation is accuracy in polymer and plasticiser selection that makes it easy to dry and not sticky.

Suyudi (2014) stated a spray gel formulation using a combination of polymer Carbopol 940 and hydroxypropyl methylcellulose (HPMC) as a gelling agent at concentration 0,4%:0,4% with the homogeneous result. Carbopol has high viscosity by a small concentration of the gelling agent. 0,1% of poloxamer 407 can be used as a film-forming of spray gel formulation (Shafira, 2015).

Based on the explanation above, we are interested in making the formulation of spray gel preparation from cherry leaf ethanol extract as antiacne and stability test is one of important aspect during a preclinical and clinical test, because that will show safety standard for storage and use (Jr, 2014)

## **1.2 Formulation of The Problem**

Based on the background of the problem above, a problem formulated as follows:

1. Can the ethanol extract of the cherry leaf (*Muntingia calabura L.*) be a formulation of spray gel preparation?
2. How much is carbopol concentration producing spray gel preparation with the right physical characteristic?
3. How are the physical and chemical stability of spray gel preparation for ethanol extract of the cherry leaf?

## **1.3 Objective of Research**

1. Formulated cherry leaf ethanol extract in spray gel preparation
2. Getting the best carbopol concentration as a base forming a gel for the proper anti-acne spray gel preparation of cherry leaf ethanol extract
3. Getting the most physical and chemical stability of antiacne spray gel preparation

## **1.4 Benefit of Research**

### **1.4.1 Theoretical Benefits**

Officially this research will be scientific treasure about the formulation of cherry leaf ethanol extract as antiacne spray gel preparation which can be a reference in natural medicine development.

### **1.4.2 Practical Benefit**

This study can be an alternative product of pharmaceutical ingredients in natural ingredients and obtains spray gel preparations containing ethanol extract of cherry leaves which have excellent physical and chemical stability so that it can be an antibacterial caused of acne that is safe for society.