CHAPTER 1 INTRODUCTION

1.1 Background

Development of commercial poultry farms sector has an important function in fulfilling the needs of animal protein in Indonesia. The ever growing market demand makes commercial chicken farming a quite promising business. Thus, poultry farms still have a considerable chance to be developed in Indonesia. However, the problem here is that the productivity generated by each farm is not always optimal. Sometimes breeders complain that the results of the production declined so steeply that the profits do not reach maximum point, or even to say a loss. Infectious disease in poultry is usually caused by virus, bacteria, parasite, and fungi. Newcastle Disease as one of viral diseases that attacks chicken is a major issue in the farming industry (Info Medion, 2011). Newcastle Disease (ND) has an important economic impact in chicken farming industry because it generates a high morbidity and mortality rate, decline in egg production, high prevention action cost, and gives rise to other respiratory diseases (Tabbu, 2000).

Newcastle Disease (ND) is an infectious respiratory disease, caused by *paramyxovirus* virus genus with *paamyxoviridae* family, attacks various kinds of poultry especially chicken. This disease is also known as *pseudofowl pest, pseudovogel pest, atypishe geflugelpest, pseudopoultry plaque, avian pest, avian distemper, Ranikhet disease, tetelo disease, Korean fowl plaque avian penumoencephalitis* (Tabbu, 2000). Newcastle disease (ND) is included in List A of the Office International des Epizooties. Historically, ND has been a devastating

disease of poultry, and in many countries the disease remains one of the major problems affecting existing or developing poultry industries. Even in countries where ND may be considered to be controlled, an economic burden is still associated with vaccination and / or maintaining strict biosecurity measures. Confirmatory diagnosis of ND requires the isolation and characterisation of the virus involved (Alexander *et al*, 2001).

In Indonesia, Newcastle Disease is endemic, characterized with the occurence of the disease throughout the year. Newcastle disease is acute to chronic characterized with both very high morbidity and mortality rate. In a susceptible gorup of chickens the disease occurs fast marked with the high rate of morbidity and mortality, can even reach 100% especially from the infection of velogenic strain of NDV, and 30-50% for the mesogenic strain (Tabbu, 2000).

ND virus can grow in the allantoic fluid and amnion fluid of embryonated chicken egg. The age of the embryonated chicken egg depends on the loacation of inoculation and virus characteristics (Ernawati *et al*., 2008).

Prevention towards Newcastle Disease is done by vaccination and maintaining a good sanitation of the environment. Various vaccines are available on the market, active vaccines, inactive vaccines, even recombinant vaccines (Alexander *et al*, 2001). Albeit the proper execution of vaccination and environmental sanitation program, Newcastle Disease in Indonesia is still can not be completely eradicated (Kencana *et al*, 2011). Therefore, an antiviral against Newcastle Disease is needed, one way is to use potential animal products. One of the animal

products that have the potential as an antiviral that can be found in Indonesia is propolis.

Propolis has been used worldwide as a folk medicine since ca. 300 BC and as a dietary supplement to maintain or improve human health (Banskota *et al*, 2001). It is currently used as an alternative medicine in the management of various ailments (Khalil, 2006). Studies of its antiviral properties have concentrated mainly on herpes simplex virus (Vynograd *et al*, 2000). It has been also shown to exhibit anti-influenza virus activity *in-vitro* (Park *et al*, 2002). Used for medicinal purposes since antiquity, propolis has been shown in more recent times to possess broad spectrum antimicrobial activity, including activity against many of the opportunistic pathogens associated with the acquired immunodeficiency syndrome (AIDS) (Banskota *et al*, 2001). Based on the studies above, it is expected that propolis can also inhibit Newcastle Disease Virus and may be an alternative medicine for treating the disease.

1.2 Statement of Problem

Does propolis extract show any antiviral property and inhibit the replication of Newcastle Disease virus in embryonated chicken egg shown in the result of hemagglutination (HA) test?

1.3 Theoretical Base

Propolis is a natural remedy that has been employed extensively since ancient times. Modern herbalists recommend it for its anti-bacterial, anti-fungal, anti-viral, hepatoprotective and anti-inflammatory properties, to increase the body's

natural resistance to infections and to treat gastroduodenal ulcers. (Castaldo and Capasso, 2002).

Propolis is very active in vitro against poliovirus and herpes viruses. In propolis, flavonoids were found to be the main constituents. The properties of propolis might be explained by this high content in flavonoids. The extracellular inactivation of enveloped viruses might be due to the flavonoids present in propolis (Amoros et al., 1992). The pharmacologically active molecules in the propolis are flavonoids and phenolic acids and their esters. These components have multiple effects on bacteria, fungi and viruses (Castaldo and Capasso, 2002).

Newcastle Disease is a respiratory and systemic disease, acute and highly infectious. In every ND cases, respiratory disruption is always presence though combined with digestion or nervous system disruption (Tabbu, 2000).

Based on the arguments above, propolis is assumed to be possible in having antiviral activity against ND virus. The increasing cases of ND inflicted many researchers to find more scientific data regarding the antiviral effect of propolis against ND virus.

1.4 Research Objective

To determine the antiviral property of propolis and its inhibition against the replication of Newcastle Disease virus in embryonated chicken egg which is shown in the result of the hemagglutination (HA) test.

1.5 Outcomes of Research

1. To provide an overview for the general public regarding the use of propolis extract as an antivirus for Newcastle Disease.

2. Veterinary World, to provide a cognition for propolis extract as an antivirus for Newcastle Disease.
3. The Ministry of Animal Husbandry and other related agencies, it is expected that this research can be a new reference to prevent the outbreak of Newcastle Disease.
4. This study may also be of reference or comparison for other subsequent researchers.

1.6 Hypothesis

Propolis extract has an effectivity as antivirus and is able to inhibit the replication of Newcastle Disease virus in embryonated chicken egg.