

CHAPTER 1 INTRODUCTION

1.1 Background

Ducks are an economically valuable avian in many regions. In Indonesia, the duck population in 2018 was 51,239,185 and it was recorded that the population from 2014 to 2018 increased by 13.19 percent and an average growth of 3.16 percent per year. Salmonella species are identified as crucial animal and human zoonotic pathogens (Humphrey, T., 2000). Salmonella was detected in poultry, animal products, cattle, dogs, small mammals, reptiles, and amphibians, according to CDC (Centers for Disease Control and Prevention) outbreaks of human illnesses connected to contact with animals and animal products in the United States. Salmonellosis is caused by Salmonella infection. Salmonellosis not only harmful to human but also causes economical loss. Food poisoning cases in Indonesia from 2009 to 2013 reported 10.700 cases per year with 411.500 people ill and 2.500 death. Government economical loss around 2,9 billion (Badan POM RI, 2015)..Salmonella has been related to a variety of illnesses in ducks, such as arthritis (Bisgaard, 1981), duckling mortality (Scott et a 1984), and egg infertility (Safwat *et al.*, 1984).

Antibiotic resistance is one of the biggest threats to global health, food security, and development today. it can affect anyone, of any age and in any country. Antibiotic resistance occurs naturally, Animals, like people, carry bacteria in their guts. Antibiotic-resistant intestinal infections can be transmitted by handling or eating infected food, or by coming direct touch with

animal waste(poop), either directly or through contaminated drinking or swimming water. Infections can also be transmitted from one person to other person.

Antibiotics are natural compounds that can only eliminate disease-causing bacteria in humans or animals that are formed by fungi or micro-organisms. Synthetic compounds (not formed by microorganisms) that can also kill or prevent bacterial growth are some antibiotics. Antibiotics do not work on viruses, such as those that cause colds, flu (CDC 2020). Although antibiotics have many advantages, their use has led to the development of resistance (Katzung, 2007).

According to the Ministry of Health of the Republic of Indonesia (2011), antibiotics are drugs used to treat bacterial infections that are bactericidal (kill bacteria) or bacteriostatic (prevent from reproducing bacteria). The use of antibiotics has now become commonplace to treat infectious diseases, antibiotics themselves have long been discovered, such as penicillin discovered by Alexander Fleming in 1929 and penicillin is very effective in the treatment of infectious diseases at that time (Brooks *et al.*, 1998). Antibiotics are not only used for therapeutic purposes in humans, but are also used in various fields such as in the field of animal husbandry, namely in terms of prophylactic of infection in animals in various animal farms or use in plants. A prophylactic is a medication or a treatment designed and used to prevent a disease from occurring. As a result of this, there is continuous and excessive exposure of human and animal flora to antibiotics, causing a selection process for bacteria resistant to antibiotics in a population of bacteria and transfer from one type of bacteria to

another (Munita & Arlas, 2016).

Incorrect use of antibiotics can cause bacteria to be resistant to antibiotics, several factors such as the production of enzymes that can break down antibiotics such as The β -lactamases (originally called penicillinases and cephalosporinases) then changes in the permeability of bacterial cells to drugs, increasing the number of endogenous substances that work antagonists drugs, changes in the number of drug receptors on bacterial cells or the nature of the components that bind the drug to its target, these factors can lead to antibiotic resistance.

More costly drugs must be used when diseases can no longer be treated by first-line antibiotics. Often in hospitals, a longer period of illness and recovery raises health care expenses as well as the economic strain on families and communities (WHO 2020). Antibiotic resistance may put current medicine's progress at risk.. Without effective antibiotics for the prevention and treatment of infections, organ transplants, chemotherapy and operations such as caesarean sections are getting even more risky (WHO 2020).

MDR is a condition in which bacteria are resistant to at least one type of antibiotic from each of the three antibiotic classes (Magiorakos *et al.*, 2012). Microorganisms, particularly bacteria, that develop multidrug resistance (MDR) are known as multidrug-resistant organisms (MDRO). Antibiotic resistance is currently a global issue; according to data from 2009, Indonesia was rated 8th out of 27 nations with the highest multidrug resistance prevalence (Supriyantoro, 2011).

1.2 Problem Statements

1. Are there salmonella bacteria that are sensitive to antibiotics in in Jombang district?
2. how many bacteria are multidrug resistant in laying duck farm in Jombang district?

1.3 Theoretical Bases

Duck is Indonesia's second-largest meat provider after chicken; the demand for duck meat is growing every year, resulting in more duck farming; the distinctive flavor of duck meat drives Indonesians to prefer duck meat, resulting in the production of high-quality duck meat. The duck meat served should be safe for human consumption, this is in accordance with the government program which produces safe, healthy, whole and halal food (ASUH). Contamination by microorganisms, especially bacteria in food itself can endanger the health of consumers, *Salmonella* spp is one of the most important pathogenic microorganisms in public health and food safety, *Salmonella* spp can infect humans if it contaminates food consumed (foodborne zoonoses) and can be a major cause of foodborne illness (Engidaw Abebe,*et al* 2020)

According to the “Badan Pusat Statistik”, duck meat production in Indonesia has increased from year to year, in 2019 duck meat production in Indonesia reached 46563 tons, which means that interest in duck meat in Indonesia is increasing over time, with the high demand for duck meat, it can lead to an increase in the use of antibiotics in ducks.

Salmonellosis is caused by Salmonella contamination. Salmonellosis in poultry flocks can cause acute and chronic clinical diseases, as well as economic losses for poultry producers, and consume substantial government and private resources for testing and control. (Gast *et al.*, 2020). Salmonella reduces egg production, stunts development, and increases condemnation at slaughterhouses, resulting in significant losses for the poultry industry (Shoaib *et al.*, 2017).

The use of antibiotics for a long and continuous period of time can significantly affect the resistance of pathogenic bacteria and normal microflora in living things when given excessively and without supervision (Bahri *et al.*, 2005). Antibiotic resistance is the inability of antibiotics to perform their function against bacteria. Antibiotic resistance is an impact that can occur as a result of incompatibility and as a reaction to antibiotic use. Resistance can occur by inactivating antibiotics, where bacteria can produce enzymes that will break down the chemical structure of the antibiotics so that the antibiotics cannot function. One of them is the beta lactamase enzyme, which is produced by the Enterobacteriaceae group of bacteria. Some bacteria are reported to be able to produce enzymes that can inactivate one antibiotic or several antibiotics (Munita , *et al.* ,2016). The ability of bacteria to modify the target of an antibiotic so that a resistance mechanism occurs is the presence of a gene mutation where the antibiotic attaches to the target.

1.4 Purposes of the Research

1. Find out whether there are *Salmonella* bacteria that are Sensitive to antibiotics in Ducks at Jombang district
2. To discover out whether there are *salmonella sp* that are multidrug resistant to antibiotics in Ducks at Jombang district

1.5 Outcome of the Research

This research is expected provide information to farmer, veterinarian, researchers, and general public about *Salmonella sp.* on duck ,also how to prevent antibiotic resistance in *Salmonella sp.* and provide data on how high the level Antibiotic resistance to *Salmonella sp.* In Mojosari alabio ducks in Jombang district.