

CHAPTER I INTRODUCTION

1.1 Background of Research

Milk is universally recognized as a complete diet due to its essential nutrients components. Public awareness of the importance of consuming milk is increasing annually. In addition to cow's milk for the fulfillment of milk consumption, goat milk is an alternative to cover the shortage amount of cow's milk supply. One of the dairy goats that have been commonly developed in Indonesia is *Peranakan Etawa* (PE) goat.

Goat milk has some advantages, one of which is as an additional food (food supplement). Goat milk can be consumed as an alternative to dairy cow milk because it is not allergens (Park *et al.*, 2007) and has high digestibility (Suwito *et al.*, 2014). Goat milk is considered to have many advantages for the body, and people usually consume goat raw milk directly without any further process such as pasteurization.

Demand for goat raw milk and consumption patterns of raw milk have increased, also followed by a higher demand for dairy products that meet high-quality standards at the beginning of the process until the long shelf life. Milk is a medium of bacterial growth and is prone to contaminate, which can affect the health of the body. The number of bacteria in milk has a decisive effect on the quality and safety of dairy products (Szteyn *et al.*, 2005). Milk contaminated by high levels of spoilage microorganism usually becomes unsuitable in terms of

health (nutritional value), safety (hygienic quality), and satisfaction (sensory attributes) (Nanu *et al.*, 2007).

The low level of sanitation application during milk handling in animal housing causes a large amount of microbial contamination in milk. *Coliform* is one of the microorganisms that is normally found in raw milk and used as an indicator of contamination and sanitation conditions that are not good for water, feed, milk, and dairy products. Cross-contamination of bacteria in milk can increase the development of the number of *coliforms* that can interfere with health (Syamsi *et al.*, 2018).

Smallholder dairies goats are run on individual household farms, and they face numerous challenges that include lack of resources for improving management and milking hygiene, and for controlling livestock diseases. The present study indicates that the *coliform* load in milk is significantly associated with clinical severity states in cases of *coliform* mastitis, and can be a useful indicator for optimal management of this disease (Nagasawa *et al.*, 2019). The use of hygienic milking procedures and hygienic storage is of utmost importance in reducing the levels of contamination of milk by bacteria (Mhone *et al.*, 2011). Important microbial groups are researched in milk to assess the hygienic procedures and conditions during production, such as *coliform* (Perin *et al.*, 2019).

According to the California Department of Food and Agriculture, the detection of *coliform* in milk does not necessarily mean that a disease-causing or pathogenic. However, elevated *coliform* counts in milk and dairy products suggest unsanitary conditions exist during production, processing, or packaging. Since

most milk-borne pathogens originate from fecal contamination, strict sanitary practices must be followed to minimize the risk to people consuming raw milk products.

The microbiological quality of goat raw milk must be determined to monitor the food safety, especially in Gombengsari, Banyuwangi, as the center of animal husbandry and agro-tourism of *Peranakan Etawa* (PE), where 90% of the population is dairy goat farmer that the milk to be sold and marketed as public consumption and where visitors can milking directly from the goat's udder.

1.2 Problem Statement

How is the amount of *coliform* that presence in raw milk *Peranakan Etawa* (PE) goat in Gombengsari, Banyuwangi?

1.3 Aim of Research

This research aims to determine the number of *coliform* in raw milk *Peranakan Etawa* (PE) goat in Gombengsari, Banyuwangi, and will be compared to the legal regulation of *coliform* limits in Indonesia to ensure whether it's safe to consume without any further process.

1.4 Outcome of Research

1.4.1 Theoretic Outcome

This research is expected to provide information about the raw milk quality of the *Peranakan Etawa* (PE) goat based on the microbiological aspect, especially the total of *coliform* in the goat raw milk in Gombengsari, Banyuwangi.

1.4.2 Practice Outcome

It is practically to provide information about the importance of knowing the quality of raw milk *Peranakan Etawa* (PE) goat and to maintain sanitation and hygienic process, so that the quality of milk can be increased, and it is safe as public consumption.

1.5 Theoretical Base

Raw milk according to SNI 3141.1-2011, is a liquid derived from healthy and clean cow udder, obtained by the right milking, which the natural content is not reduced or added anything and has not gotten any treatment except cooling. Milk is an excellent medium for microorganism growth. The presence of the microorganism in milk indicates possible contamination by dirt, soil, and water.

The presence of *coliform* does not necessarily indicate direct contamination of the fecal in milk, but rather as a poor indicator of hygiene and sanitation during milk milking and their continued treatment (Chye *et al.*, 2004). The number of *coliform* in goat milk is influenced by milking environment, and washing the udder before milking is a crucial thing to do because the dirty udder by urine or dirt occurs when the goat lays in pen (Suwito *et al.*, 2018).

Coliform test has been done in the dairy product industry and has contributed to identifying raw milk and its dairy products that may have been contaminated with bad sanitation conditions. *Coliform* is a Gram-negative and non-spores bacteria that can ferment lactose by producing acids and gases at 35°C for 48 hours. To detect the presence of *coliform* has been done in the United States in the dairy industry (Martin *et al.*, 2016). *Coliform* is almost always found in raw milk, but with the correct procedure, the amount of *coliform* can be kept low (Salman and Hamad, 2011).

The Most Probable Number (MPN) is widely used to determine the total number of *coliforms* present in one mL of milk sample (AOAC, 1996). MPN method uses the calculation of the number of bacteria with more than one culture,

and gradual dilution to determine the proportion of some cultures that show the growth of bacteria. Liquid enrichment is used to support repair (recovery) and bacterial growth (Darmansah *et al.*, 2011). SNI 7388:2009 sets the maximum limit of *coliform* in raw milk is 2×10^1 MPN/mL.