

CHAPTER 1 INTRODUCTION

1.1 Background

Milk plays a role in healthy human nutrition and development throughout life. It contains numerous nutrients and contributes to meeting the body's needs for calcium, magnesium, selenium, riboflavin, vitamin B12, and pantothenic acid (vitamin B5) (FAO, 2013). Raw milk national demand and its derivative products predict to continue to increase in line with population and economic growth (Kementan, 2019). Based on Law Number 36 of 2009, one of the national development priorities is society's nutrition status improvement. Veterinary Public Health has the responsibility to provide food safety guarantees from animal resources called ASUH (safe, healthy, wholesome, and halal) consume by society (Wuryaningsih, 2010).

Milk quality can affect by contamination and ensure proper handling since it's a perishable material (Guetouache *et al.*, 2014). Bacterial contamination found in raw milk is one of the indicators used for milk quality assessment. The milk quality is paramount, therefore it must have to transport and store with proper handling under optimal conditions (Roux *et al.*, 1995; Mourad *et al.*, 2014). Milk contamination may occur from bacteria that live on an animal's skin, animal feces that coming into direct contact with the milk, cow disease for example mastitis that causes udder infection and bovine tuberculosis, environment for example feces, dirt, processing equipment, rodents, insects, and other animal vectors, and milk

processing plants' unsanitary conditions and dairy workers cross-contamination (CDC, 2021).

Milk demand enhancement is one of the factors of dairy farming development in Indonesia. Currently, dairy farming in Indonesia is still dominated by smallholder farming, but farmers face problems in the low production of cow's milk whose quality cannot meet the milk processing industry standards quality. The problem of low production besides genetic factors is influenced by environmental factors such as maintenance management including feeding and livestock health (Efendi *et al.*, 2020).

The largest dairy cattle population with the highest milk production in Indonesia is currently dominated by East Java province, which makes it a national center for dairy cattle. Then, the largest dairy cattle population in East Java is in Malang, Pasuruan, Blitar, Tulungagung, and several other potential areas (Andri, 2012). Based on Central Statistics Agency for East Java province data in 2017, the dairy cattle population in Tulungagung Regency is 25.355 dairy cows and the production is 49.510.354 kg per year. That makes included as one of the largest economic contributors in the dairy farming sector for fulfilling dairy cow's needs (BPS, 2022).

Bacterial contamination total number in milk can decrease milk quality. This is because the milk that contains pathogenic bacteria can be the source of foodborne disease. There're two forms of poisoning after drinking milk namely infection and intoxication. Infection occurs due to consuming milk contaminated with bacteria, while intoxication occurs due to consuming milk that contains toxins (Suwito,

2010). In 2014, Septiani and Drastini stated that the raw milk bacteria total number (TPC) in one of Tulungagung cooperatives showed a number $4,0 \times 10^6$ CFU/ml which doesn't meet the SNI 3141.1:2011 requirements. That bacterial contamination in raw milk has a maximum limit with a maximum total bacteria (TPC) of $1,0 \times 10^6$ CFU/ml (SNI, 2011).

BUMDes Sinar Mulya is an enterprise owned by a village that has a milking unit that providing ten milk posts for collecting milk to facilitate dairy farmers in Mulyosari, Tulungagung. Farms in the BUMDes Sinar Mulya working area still use traditional methods, both milking, and the maintenance system. In each place, all farmers have to obey rules to prevent milk contamination. Milk is an excellent medium for microorganism's growth, which when allowed to grow, will produce changes that make milk unfit for human use (Bejon, 2006). For this reason, quality examines by a good and proper procedure that must do regular and systematic. (Prawesthirini *et al.*, 2016).

Based on the background explanation above it's important to find raw milk bacteria total numbers at BUMDes Sinar Mulya Tulungagung working area.

1.2 Research Problem

Based on the background above, the formulation of problem in this research is: What is the total number of bacteria in raw milk at BUMDes Sinar Mulya Tulungagung working area?

1.3 Theoretical Base

According to Agricultural Quarantine Agency's Head Decree No. 355.a/Kpts/PD.670,320/L/9/2008 concerning technical guidelines for inspection

and testing of Hama Penyakit Hewan Karantina (HPHK) on milk and its processed products explain that raw milk is a liquid obtained from healthy dairy cattle with the correct way of milking continuously without reducing anything and/or adding any other ingredients to it and doesn't get any treatment except the cooling process without affecting its purity.

Badan Standarisasi Nasional has mentioned what types of microbial contamination and the maximum limit to meet the standard quality of raw milk. Types of microbial contamination in raw milk that have requirements to meet the maximum limit such as Coliform, *Escherichia coli*, *Salmonella* sp., and *Staphylococcus aureus*. Further, SNI 7388 of 2009 explains that total bacterial contamination found in raw milk is maximum 1×10^6 colony/ml and maximum coliform content is 2×10^1 colony/ml (SNI, 2009).

The level of bacterial contamination is determined by the Total Plate Count (TPC) method. Total Plate Count is one of the microbiological tests used to assess the milk quality. A microbiological examination is an important test because it uses to determine the shelf life, sanitation, and milk safety indicators. The TPC is a method of counting whole germs which has the principle that when living bacterial cells grow on agar media, these cells will multiply and form colonies that can be seen with the eye without using a microscope. It has two methods namely the pour plate method and the surface plate method (Prawesthirini *et al.*, 2016).

1.4 Aim of Research

The purpose of this research is to determine the total number of bacteria in raw milk at BUMDes Sinar Mulya Tulungagung working area by Total Plate Count (TPC) Method compared to SNI 3141.1:2011.

1.5 Outcome of Research

This study is expected to provide scientific information about the total number of bacteria in raw milk at BUMDes Sinar Mulya Tulungagung working area. Therefore, farmer is expected to know the quality of milk that was produced, in order to improve the management of milking, processing, storing, and marketing of its products. In addition, this study is also expected to broaden the society's insight to be more careful in choosing milk products that meet National Standard of Indonesia that ensures the safety and quality of milk as food consumed by the community.