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Quality And Emulsion Stability Of Milk From Ettawah Crossed Bred Goat During Frozen Storage

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Abstract

Goat milk has specific chemical composition and physical properties. The purpose of this study was to investigate the change of milk quality and emulsion stability during 60 d frozen storage. Milk sample was taken from three Ettawah Crossedbred goats that were divided into three groups. Samples were frozen and stored for 0, 30 and 60 days. At the end of each storage periode, milk sample was thawed in the refrigerator and analyzed for total number of bacteria, chemical (acidity, pH, free fatty acids), physical (alcohol test, clot on boiling test) quality, and emulsion stability. The microbiological and chemical data were analyzed statistically using one way ANOVA, whereas physical quality and emulsion stability were expressed qualitatively. There were no change in the total bacteria, acidity, pH and free fatty acid (FFA) of milk during storage, whereas the assessment by 70% alcohol showed positive since 0 d. Emulsions stability changed after 30 d of storage. While, the clot on boiling (COB) test of milk was positive at 60 d of storage. Recommendation is frozen storage of goat milk should not longer than 30 d.

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Introduction

Dairy goats are about one-sixth the size of a cow. This makes them easier to handle, and many people prefer them for this reason. Their size also enables them to be transported. Dairy goats can range comfortably on a smaller acreage than a cow [1].

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Goat milk is known to have better qualities such as digestibility and longer shelf life than cow milk [2]. The curd of goat milk is softer than the curd of cow milk, and consequently the more easily it is digested. Size also has something to do with its digestibility, and the curd of cow's milk is large and dissolves more slowly. The finer curd of goat's milk dissolves more rapidly. This means that for some people with digestive difficulties, goat's milk may be more easily digested [1].

Goat milk sold in retail packages shall contain not less than 2.5% milk fat and not less than 7.5% milk solids-not-fat [3]. The standard classifies the normal condition of goat milk based on physico-chemical properties as well as level of bacterial contamination and antimicrobial residue [4]. Comparison studies conducted on cow and goat milk indicated significant species differences with resulting compositional differences that preclude the continued reference to a single set of legal quality standards. The compositional differences included: somatic cell content, short-chain fatty acid ratio, casein content, fat content, alkaline phosphatase content, vitamin content and freezing point. When tested by cow's milk criteria and methodology, normal goat milk could have been judged to be abnormal due to its deviation from the standard levels [3].

The amount of goat milk is a lot less than that of the cows, a good pooling together system can enable the milk to be processed in a small plant which can be started for a better storage of the milk. Also hygienic of goat milk products could be available all the year round in most communities. Thus, it can improve the household food security and nutrition [2]. The goat milk in Indonesia is produced in small farmer and collected at milk collecting point and then stored in cold or freezing temperature to wait for processing or marketing to the city. However, in the case for hygiene and quality of goat milk have not been monitored. Furthermore, the lower amount of goat milk production in each farm, necessitates certain alternative methods of the milk preservation in order to be marketed throughout the year.

Freezing can be a simple process to implement and can extend the shelf life by years in some cases. Product quality is better retained with faster freezing speeds due to the smaller size of ice crystals formed [5]. Temperature also determines the physical state of oil droplets in O/W emulsions, which influences the emulsion properties such as viscosity and stability. Some emulsions become unstable when they are frozen and thawed [6]. The purpose of this study were to determine the effect of frozen-storage on physical, chemical, and microbiological quality and also emulsion stability of milk from Ettawah Crossedbred goat.

Materials & Methods

Milk sample was taken from three Ettawah Crossedbred goats from Sleman-Yogyakarta. Each sample was divided into three parts for different period of frozen storage (-20°C): 1) 0 d (fresh goat milk), 2) 30 d, and 3) 60 d. After storage, milk sample was thawed in refrigerator for 24 h, and then analyzed for total bacteria, titratable acidity, pH, free fatty acid (FFA), alcohol, clot on boiling (COB) test and microscopic evaluation of milk emulsion.

The total count of bacteria was determined by Standard Plate Count (SPC) method according to [7] with slight modification using plate count agar (Merck). The viable bacteria are enumerated on Plate Count Agar (PCA)

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