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Fatty Acids Profiles of Fresh Milk, Yogurt and Concentrated Yogurt from Peranakan Etawah Goat Milk

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Abstract

The objective of the study was to characterize the fatty acids profiles of goat milk and its fermented products i.e. yogurt and concentrated yogurt. Fresh milk from Peranakan Etawah goats was collected directly from local goat farmers, and processed into stirred-type fresh yogurt. The yogurt was then further processed into concentrated yogurt using *Berge* method. A total of 26 fatty acids were detected in milk, yogurt and concentrated yogurt, comprised of both saturated and unsaturated fatty acids. The oleic acid, stearic acid and palmitic acid were the major fatty acids found in fresh milk, yogurt and concentrated yogurt. There were changes in the profiles of individual fatty acids during processing of fresh goat milk into yogurt and concentrated yogurt.

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INTRODUCTION

The current milk consumption in Indonesia is approximately 15 litres per capita per year and more than 70% of milk and milk products are imported from other countries such as Australia and New Zealand. Although gaining popularity in recent years, the contribution of goat milk to the total milk production in the country is still very limited. Goat milk is produced mostly by Peranakan Etawah goats, Saanen goats and their crosses. In some areas, goat milk is highly valuable with its price two or even three times higher than cow milk's price.

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Goat milk contains various nutrients needed by human body. Goat milk has been reported to have unique characteristics when compared to cow milk. For example, although the percentage of fat in goat and cow milk is similar, the average size of fat globules in goat milk is smaller than those in cow milk. Goat milk also contains higher proportion of fatty acids such as caproic, caprylic and capric, which are partly responsible for the unique flavor of fresh goat milk and its products [1]. In addition, the clotting behavior of goat milk was also different from cow milk [2]. In term of causing allergy, goat milk has been reported to have less allergenicity than cow milk [3]. Fatty acids of goat milk are predominated by C16:0, C18:1, C14:0, and C10:0 [4].

Yogurt and concentrated yogurt are two examples of popular fermented milk products. The popularity of fermented milk can be attributed to their health benefits and therapeutic properties [5]. Yogurt is produced by lactic acid fermentation of lactose in milk by lactic acid bacteria, such as *Lactobacillus bulgaricus* and *Streptococcus thermophiles*. The synergistic actions of these two bacteria contribute to the specific texture, composition and sensory properties of yogurt [6]. Fresh yogurt can be processed further into concentrated yogurt by partial removal of its whey using traditional cloth-bag (Berge) or centrifugal separator methods [7], although other methods were also investigated [8, 9]. Concentrated yogurt is a semi solid product with creamy consistency, acidic flavor, with total solid content between 23 and 25 g 100g⁻¹ [9].

Several factors may be contributed to fatty acids composition of milk and milk products, such as diet, stage of lactation, and season [10], species [11], as well as processing and storage [12, 13]. For example, yogurt produced from cow, sheep and goat milk yogurt contain 0.128-1.501, 0.405-1.250 and 0.433-0.976 g conjugated linoleic acid or CLA per 100 g fat, respectively [11]. Free fatty acids have been changed significantly in salted yogurt during storage [14]. Changes in composition and fatty acids profiles contribute to the nutritional and sensory properties of products. To date, reports on fatty acid profiles of milk and its fermented products from Peranakan Etawah goats are very limited. Therefore, this research was conducted in an attempt to characterize fatty acids profiles of fresh goat milk and its fermented products, namely yogurt and concentrated yogurt. In this paper, data on individual and groups of fatty acids are presented, which may benefit for providing a more comprehensive nutritional contents of goat milk and its fermented products as functional dairy products

MATERIAL AND METHODS

Goat Milk Samples

Fresh goat milk was obtained from Peranakan Etawah Goats Breeding Farm in Banyumas, Central Java Province. The goats were milked in the morning and the samples were composite samples from 5 goats. The milk was transported to the laboratory in a cool box to ensure freshness and avoid contamination. Upon reception in the laboratory, the milk was pasteurized using a low temperature long time method at 63°C for 30 min.

Yogurt and Concentrated Yogurt Preparation

Five batches of stirred-type goat milk yogurt were made by adding 5% (w/w) previously activated lyophilized yogurt culture containing *S. thermophiles*, *L. bulgaricus*, and *L. acidophilus*. Incubation was done in a tightly closed stainless steel container for 5 hours at 40°C. Samples of yogurt were collected and stored in glass containers in a refrigerator at 5°C, and ready for fat extraction. The remaining yogurt was transferred into a clean cheese-cloth, tied up and hung in a cold room

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