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Composition and Isolation of Lactoferrin from Colostrum and Milk of Various Goat Breeds

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Abstract

Dairy goats colostrum is one of lactoferrin source which has various benefits such as antimicrobial activity. The samples of colostrum and milk are samples of three breeds of goats. The highest concentration of lactoferrin in colostrum and milk is 88.70 ± 12.11 mg/l for saanen goats crosses with PE goats (SAPE), with approximately molecular mass of lactoferrin is 83,513.3 Dalton and the last is 72.57 ± 23.61 mg/l for peranakan etawah (PE), with approximately molecular mass of lactoferrin is 86,075.4 Dalton. These results have important information as a basic knowledge of the value of the concentration of lactoferrin in goat breeds.

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Introduction

Goats are one of the types of animals that potentially developed into a producer of meat and milk in Indonesia. Several types of dairy goats breeds that can be developed in Indonesia, among others Peranakan Etawah goats (PE), Jawarandu goat and Saanen goats crosses with PE goats

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(SAPE). Maintenance of dairy goats could provide valuable animal protein of high biological and essential minerals and vitamins from cattle. According to comprehensive studies it was established [12] that goat's milk has a nutritional value similar to cow's milk and can be used as an alternative to cow's milk for the rehabilitation of children, who suffer from poor nutrition. Goat colostrum lactoferrin concentration is higher than cow's milk, which ranged from 455.8 to 2058.3 mg / dl on goat colostrum and 575.0 mg / dl in bovine colostrum [7]. Goat colostrum lactoferrin concentration is high due to the quantity of goat colostrum produced. The higher the quantity of colostrum, then the quality will be reduced, in terms of dry matter high goat colostrum, which ranged between 25.43 to 38.96%, while the dry matter 18.30% bovine colostrum[11].

Goat's milk has a milk components such as lactoferrin, immunoglobulins and lactoperoxidase as an anti-microbial. Lactoferrin in milk are able to bind metal ions on the microbes that inhibit microbial growth. Lactoferrin can be used for enrichment or fortification of milk. High levels of lactoferrin in milk will improve the quality of milk, especially microbiological quality and value to milk as a functional food. Based on the function of proteins chemically, then there are two possible physiological functions of lactoferrin, namely: 1) as a source of iron for infants / children and 2) a potential antimicrobial factors in the milk ducts in the digestive tract and baby / children [2,5,6]

Colostrum also called "mother's milk" is a light yellow solution produced by glands udder during the first hour after birth, usually began to be produced before birth and collected over the last few weeks of pregnancy [3]. Colostrum is stored by the udder glands around 2-3 last day of gestation and secreted approximately 2-3 first days after birth. Colostrum is no longer produced at 4-5 days after birth, then there will be changes in the colostrum into milk completely [3] Colostrum has a serum protein content is very high and often still contained blood [16]. The things that affect levels of lactoferrin in colostrum generally include 1) day milking, colostrum has a higher lactoferrin levels (575.0 mg / dl in colostrum of cows and 459.4 mg / dl in cow's milk) [7], 2) presence or absence of bacterial infection [15], and 3) Genetic animal itself [14].

Preliminary studies that identify the presence of lactoferrin in milk goat "kacang", and goat colostrum and milk have been conducted [10]. The results of these studies indicate that lactoferrin band has gained a molecular weight of 73.441 kDa for goat milk and "kacang" goat milk whereas for colostrum peranakan etawah (PE) goats molecular weight of 74.991 kDa were obtained. However, information on the isolation of lactoferrin contained in colostrum and milk from various dairy goats breeds is still very limited. This study aims to (1) Studying the influence of the chemical composition of colostrum and milk of goats breeds Peranakan Etawah (PE), Jawarandu and Saanen goats crosses with PE goats (SAPE), including dry matter content, non fat dry matter, protein, specific gravity, and pH on lactoferrin to be identified, (2) Perform insulation lactoferrin from colostrum and goat milk to obtain isolates lactoferrin, and (3) Identify the presence of lactoferrin to determine the concentration and lactoferrin content in colostrum and milk goats were studied.

Materials & Methods

This research used colostrum and milk from the Peranakan Etawah goats (PE), Jawarandu, and Saanen goats crosses with PE goats (SAPE) that were obtained from local farm. The method of research was Completely Randomize Design (RAL) factorial pattern (3×8) with three repetition treatments to the various species of goats and different days of milking. Colostrum

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