

THE COMPARASION BETWEEN HUMAN, COWS, AND SHEEP MILK

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ABSTRACT

The composition of milk varies according to the animal from which it cows, providing the correct rate of growth and development for the young of that species. This study is applied to show the main differences between human, cows, and sheep milk components. This study executed on 20 women aged (24 ± 4) years old selected randomly, and 14 cows with 14 sheeps. Milk glutathione GSH, total lipid, and vitamin E were investigated. GSH levels were significantly ($p \leq 0.05$) higher in human milk than in cow in sheep milk, and lower level of total lipid and vitamin E was significantly ($p \leq 0.05$) in human milk than that of cow and sheep milk.

KEYWORDS: Vitamin E, GSH, Total lipids, and human milk.

INTRODUCTION

Milk is a very complex fluid, containing carbohydrates, salts, caseins in colloidal dispersion, cells and cellular debris, and lipids habitually in emulsified globules (Khalid R, 2007). Also contains the fat soluble vitamins A, D, E, and K. The level of fat-soluble vitamins in milk depends on the fat content of the product. Reduced fat (2% fat), low fat (1% fat), and skim milk must be encouraged with vitamin A to be nutritionally equivalent to the milk (JD Bobb & DVM, 1999). Fortification of all milk with vitamin D is a volunteer. Milk consists small amounts of vitamins E and K and is not considered a major source of these vitamins in the diet (JD Bobb & DVM, 1999). Human milk provides a complex collection of lipids that donate energy, as well as the essential *n-6* and *n-3* PUFA to provision the growth and development of the breast-fed infant (Sheila M, 2007). The lipids are triacylglycerols (TG,

98%), phospholipid (PL, 0.8%), cholesterol (C, 0.5%), and others (KC Hayes, et al., 2001). The vitamins have several roles in the body including metabolism co-factors, oxygen transport also antioxidants. All of these are help the body use carbohydrates, protein, and fat. The biological function of vitamin E is as an antioxidant which defends the polyunsaturated fatty acids of cell membranes against free-radical damage (O Korchazhkina, et al. 2006). The ability of α -tocopherol to defend LDL against peroxidation was exposed clinically (Ankrah N. A., et al., 2000). The breast milk of human storage for use later in infant feeding is on the upsurge as a result of the financial activities of nursing mothers. Many studies investigated that glutathione (GSH) status of stored human breast milk due to its main antioxidant role and as a cofactor for enzymes in the detoxification of carcinogens. In infants, human breast milk develops an important source of dietary GSH since their GSH synthetic capacity may not be well developed (O Korchazhkina, et al., 2006). GSH achieves many important physiological functions such as (a) inactivation of oxygen-derived highly reactive species (Giovanni Li, et al., 2010; Nicola T, et al., 2013); (b) detoxification of various types of xenobiotics (Giovanni Li, et al., 2010) and carcinogens (Nicola T, et al., 2013); (c) maintenance of the oxidative status of other antioxidants such as ascorbic acid and α - tocopherol (V. Lobo, et al., 2010); and (d) improvement of cellular immune response by activation of lymphocytes (Nazzareno B., et al., 2009).

METHODS AND MATERIALS

This study involved milk of twenty women, their baby women aged between 3- 6 months, while the age of women was between 20-35 years, and the number of births for all women between 1 and 3 babies. This human milk compared with fourteen cows and sheep. The samples were centrifuged at 2000 xg for 10 minutes and used for determination of the parameters under study.

Vitamin E was determined by using a method (C. A. Burtis, 1999); tocopherols is used as an index of the concentration of the vitamin in the specimen. *Total lipid* was estimated by using the phosphoric acid-vanillin reaction (Joseph A., et al., 1972). In this method, the lipid specimen is heated with concentrated sulfuric acid. Then vanillin and phosphoric acid are added to yield a pink colored product. *Reduced Glutathione (GSH)* was assayed by the method (Teitze F., 1969). *Statistical analysis* was performed by Microsoft excel 2010. The data as expressed as mean \pm SD and statistical significance was set at ($P \leq 0.05$).

RESULTS

The present study investigated the differences between milk of human and cow's milk with sheep milk. GSH, Vit E, and Total lipid were given in Table 1 below.

The milk		GSH ($\mu\text{mole/L}$)	Vitamin E (mg/L)	Total lipid (mg/100 ml)
Human milk	0	6.67 ± 2.81	8.06 ± 1.5	10872 ± 1871
Cow milk	4	1.65 ± 0.35	14.1 ± 1.6	2441 ± 472
Sheep milk	4	1.9 ± 0.28	23.5 ± 3.6	8221 ± 2251

The significant rise in GSH level ($p \leq 0.05$) and total lipid for human milk with cow and sheep milk, vitamin E levels were significantly decreased in human milk compared with cow and sheep milk ($p \leq 0.05$) shown in Table 1.

DISCUSSION

The milk of cow's and the milk of human contain a alike percentage of water, the comparative amounts of carbohydrate, protein, fat, vitamins and minerals vary widely. The quantity and type of fat present in the milk likewise reflect the requirements of the classes of animal producing that milk (Joseph A., et al., 1972; Murray R. K., 1996). The elevation level of unsaturated fatty acids in human milk reproduces the essential role of these fats in brain development (Murray R. K., 1996). The brain in humans grows quickly during the first year of life, growing faster than the body and tripling in size through the age of one (Sheila M., 2007). The brain is mostly composed of fat and initial brain development and function in humans necessitates a sufficient supply of polyunsaturated essential fatty acids. The omega-6 fatty acid arachidonic acid (AA) and the omega-3 fatty acid docosahexaenoic acid (DHA) are both essential for brain growth and effective. Both are not supplied in cow's milk but they supplied in human milk (J. Barlowska M., et al., 2011). the fatty acid conformation of cow's milk is more suitable to a calf than to a individual. Attempts to change the fatty acid structure of cow's milk, and so increase the dietary value of cow's milk to humans, have complicated experiments nourishing cows, fish meal and soya beans (Brown W., et al., 2008). Glutathione is a energetic substance that changes fat-soluble toxins into water-soluble forms, thus they can be securely and efficiently removed by the body. This helps inhibit the buildup in the body of various fat-soluble toxins. Glutathione is also desired for the detoxification of methylglyoxal, a toxin formed as a by-product of metabolism (Da Costa P. M., et al., 2010). Vitamin E existent in utmost milk types, but improved in sheep when associated with other groups, it's a very important antioxidant in defensive lipid membranes from oxidant

compounds. Vitamin E reacts quickly with radicals and produce a stable tocopherol radical which can be abridged by ascorbic acid to tocopherol (Luay A. A., et al., 2013).

CONCLUSION

Elevation of GSH and decreasing of total lipids indicate that human milk is obviously more suitable than cow and sheep milk.

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