



Research Article

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Comparison between Nutritional Values in Cow's Milk, and Goat Milk Infant Formulas

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ABSTRACT

The importance of nutritional value, acceptable taste and neutrality but, an adequate amount of nutrients leads to balanced and effective nutrition, which is meant by "healthy nutrition" (vitamins, proteins, carbohydrates, lipids, minerals) necessary to make the cells of the body. In recent years, factors such as social, economic and food values have had a significant impact on the food industry, because of the production of these new foods that have the required health-related properties and are marketed. Products using goat's milk include these new foods. The point of view of goat's milk is a valuable dairy product. The main objective of this study is to compare the formula of cow's milk and goat's milk compared to breast milk and to show the importance of goat milk formula because it contains important and essential elements of healthy nutrition as it contains calcium, magnesium and phosphorus higher than cow's milk formula but vitamin D and B12 were less than the formula of cow's milk. Although the proportion of protein and fat is lower in goat milk formula compared to the cow milk formula but there is a non-significant difference between protein, fat and lactose content of cow's and goat's milk. However, the difference was found in the fat globule in goat milk is less than cow's milk, which makes the formula of goat milk easier to digest and suitable for adults, infants and athletes. In this research, we will discuss the nutritional value of cow milk formula and goat products available in the market, "infant milk" and compare them with breast milk.

Key words: *Brands, Formula, Infant Health, Nutrition.*

INTRODUCTION

Excellent source of most basic human minerals, which carries a high nutritional value (milk) often contains calcium and phosphorus and is the most important source of calcium found in our food (ICAR, 1981). Milk and dairy products are part of a healthy diet. Milk composition varies in different animal species, but in each case, it has a high priority in human nutrition. It is important to help individuals meet their dietary needs. Now, this dietary field goes beyond the study of essential nutrients. Differences between species, which are symptomatic of evolutionary adaptation to the different requirements of newborns, can be of great biological importance. Research over the past 20 years has focused on cow's milk formula [1].

Thus, goat milk remains an important attractive research subject, with the possibility of developing easily digestible dairy. Milk products for groups of consumers with the special need's category, such as aged adults, infants and athletes is growing stronger. In addition, dairy products may have specific health effects when ingested as part of their daily diet and may be appropriate compounds of the p-peptides that reduce the activity of the Angiotensin-converting enzyme, which is involved in vasoconstriction and thus blood pressure. The attendance of phosphor- casein-peptide may enhance the physiological importance of dairy products. As part of the "non-nitrogen" is capable to transfer messages such as biochemical nucleotide and polyamine and, it has also attracted special scientific interest. Further exploration of goat milk is warranted to understand his culture and the function of milk appropriate. The cow milk formula is suitable for healthiest babies and is recommended

for formulas made from soy or modified lactose. Milk formulas made from dairy products have been developed to be very close to the formula of breast milk to be given to the baby since birth. Cow's milk contains all the nutrients, especially the "iron" necessary for the growth of the infant and its development, so it is a suitable formula and safe for the infant. Goat formula contains higher levels of protein compared to cow's milk, so it is observed as generally begin at higher end of the acceptable protein range, Goat milk formula has a unique formula compared to cow's milk, as it is rich in nutrients. The structural uniqueness of goats' milk lies in its high natural levels of vitamins, minerals, and many other elements found naturally in goats' milk, such as the prebiotic oligosaccharides. A large proportion of the world's population suffer from the difficulty of digesting lactose in cow's milk known as "lactose Intolerance"[2-4]

Several symptoms, such as gas, diarrhea and convulsions are caused by a lack of lactase in formula. However, it has been reported that most people suffering from lactose intolerance were able to enjoy drinking goat milk without symptoms because goat milk is particularly low in lactose content. Although the mineral content of goat and cow's milk is generally similar, it has been found that goat milk contains 13%, 25%, 47%, 134% of calcium, vitamin B6, vitamin A, and potassium, respectively, and three times more niacin than formula of cow milk. It is also four times higher in copper 'cu'. Moreover, it contains 27% of the selenium antioxidant of cow's milk. In addition, cow's milk contains five times as much B12 vitamin than goat's milk and 10 times the amount of folic acid (12 mg versus 1 mg in cow's milk and goats' milk respectively) at 8 ounces with a recommended daily allowance of 75-100 mg Cow's milk. Goat milk is low in essential fatty acids, and the goat that causes the disease has destructive bacteria from the EFA in the stomach rumen, although goat's milk contains more linoleic essential fatty acids and fatty acids, in addition to a high proportion of short and medium fatty acid Series, these are easier on the integer Intestinal enzymes of digestion [5-7]

Objectives

The aim of this study is to compare the formula of goat's milk and formula of cow's milk with breast milk, which are the closest and most suitable for infants.

METHODOLOGY

This study was conducted based on the observation in Saudi Arabia, during December 2018. This research involved a comparison of two brands of infant formula (cow's milk and goat's milk which were designed and marketed for infant feeding; formulas were chosen based on their international popularity). The composition of the milk formula is assembled based on the information written on the milk formula container. The collected ingredients of the included formulas were accurately documented using Microsoft Office programs. Each type of formula included basic nutrients, minerals and vitamins

RESULTS

Composition of the Milks

Compositions of human, goat and cow milk formula are different as shown in Table 1; they vary with diet, breed, individuals, parity, season, feeding, management, environmental conditions, locality, stage of lactation, and health status of the udder. The advantage of goat's milk formula for cow's milk formula compared to human milk is that it is easier to be digested and its more portability and ability to cache and alkalinity, as well as in the therapeutic values on human nutrition and medicine. The formula for the composition of goat's milk is not significantly different from the formula of cow's milk. But goat milk formula has some characteristics that give it technological advantages compared to cow's milk formula as the size of fat globules is smaller, which provides a smoother texture in derived products, lower amounts of as1-casein, resulting in softer gel products, and a higher water content [8-10].

Table 1. Basic Nutrients, Minerals and Vitamins Concentrations (per 100 g) for cow, goat and human milk formula [11, 12]

	Constituents	Cow	Goat	Human
Basic nutrients	Protein (g)	3.3	3.5	1.2
	Fat (g)	3.6	3.8	4
	Lactose (g)	4.6	4.1	6.9
	Calories (cal)	69	70	68

	Total solids (g)	12.3	12.2	12.3
	Ash(g)	0.7	0.8	0.2
Mineral	Calcium "Ca" (mg)	122	134	33
	Magnesium "Mg" (mg)	119	141	43
	Phosphorus"P" (mg)	119	141	43
	sodium"Na" (mg)	58	41	15
	potassium"K" (mg)	152	181	55
	chlorine "Cl" (mg)	100	150	60
	Iron"Fe" (mg)	0.08	0.07	0.2
	Sulfur"s" (mg)	-	2.89	-
	Copper "Cu" (mg)	0.06	0.05	0.06
	Manganese"Mn" (mg)	0.02	0.032	0.07
	selenium "Se" (mg)	0.96	1.33	1.52
	Iodine "I" (mg)	0.021	0.022	0.007
	Zinc "Zn" (mg)	0.53	0.56	0.38
	Vitamin	Vitamin A(I.U.)	126	185
Vitamin D(I.U.)		2	2.3	1.4
Vitamin C (mg)		0.94	1.29	5
Vitamin B12 (mg)		0.357	0.065	0.03
Vitamin B6 (mg)		0.042	0.046	0.011
Pantothenic acid(mg)		0.32	0.31	0.2
Folic acid (mg)		5	1	5.5
Thiamine (mg)		0.045	0.068	0.017
Biotin (mg)		2	1.5	0.4
Riboflavin (mg)		0.16	0.21	0.02
Niacin (mg)		0.08	0.27	0.17

1. Cow's milk infant formulas Pure Bliss™ by Similacs.

Cow's milk formula contains two types of proteins - whey and casein. The first formula for infants is based on whey protein and is believed to be easier to digest than other types of formulas [13].

Table 2. the nutritional value for Cow's milk infant formula Pure Bliss™ by Similacs. [13]

	Constituents	Amount per serving
Basic nutrients	Protein (g)	2.07
	Fat (g)	5.6
	Carbohydrate (g)	10.7
	Calories (cal)	100
	Linoleic Acid, (mg)	938
Mineral	Calcium "Ca" (mg)	82
	Calcium "Ca" (mEq)	4.1
	Phosphorus"P" (mg)	44
	Magnesium "Mg" (mg)	6
	Magnesium "Mg" (mEq)	5
	potassium"K" (mg)	110
	potassium"K" (mEq)	2.8
	sodium"Na" (mg)	25
	sodium"Na" (mEq)	1.1
	chlorine "Cl" (mg)	60
	Sulfur"s" (mg)	-
	Copper "Cu" (mg)	95
	Iron"Fe" (mg)	0.2
	Iodine "I" (mg)	1.9
	selenium "Se" (mg)	-
	Manganese"Mn" (mg)	6
Zinc "Zn" (mg)	0.79	
Vitamin	Vitamin A(I.U.)	300
	Thiamin(Vitamin B1), (mcg)	100
	Vitamin D(I.U.)	75
	Riboflavin(VitaminB2),(mcg)	160
	Vitamin E(I.U.)	1.5
	Vitamin K(I.U.)	8
Pantothenic acid(mg)	470	

	Vitamin B6 (mg)	63
	Folic acid (mg)	16
	Vitamin B12(mcg)	0.26
	Niacin, (mcg)	1100
	Biotin (mg)	4.6
	Vitamin C (mg)	9

2. Goat milk infant formulas Kabrita Toddler.

The formula of goat milk is characterized by containing many of the main nutrients and an excellent source of minerals and vitamins such as phosphorus, riboflavin, calcium and many other elements. Moreover, it is rich in medium-chain fatty acids. The formula for goat's milk is an excellent alternative to cow milk formula because it more advantaguous than cow's milk in terms of ease of digestion, less compared with milk powder and less inflammatory. Table 2 shows the nutritional value for goat milk infant formulas Kabrita Toddler [14].

Table 3. the nutritional value for goat milk infant formulas Kabrita Toddler. [14]

	Constituents	Amount per serving
Basic nutrients	Protein (g)	3.0
	Fat (g)	4.0
	Carbohydrate (g)	11.0
	Linoleic Acid, (mg)	55.5
	Calories (cal)	90.0
Minerals	Calcium "Ca" (mg)	63.2
	Phosphorus"P" (mg)	111.4
	Magnesium "Mg" (mg)	8.2
	Magnesium "Mg" (mEq)	13.4
	potassium"K" (mg)	130
	chlorine "Cl" (mg)	84
	sodium"Na" (mg)	35
	Sulfur"s" (mg)	-
	Iron"Fe" (mg)	1.77
	Copper "Cu" (mcg)	68.1
	Manganese"Mn" (mg)	8.2
	Zinc "Zn" (mg)	0.88
	Iodine "I" (mg)	10.9
	selenium "Se" (mg)	2.5
Vitamins	Vitamin A(I.U.)	264
	Thiamin(Vitamin B1), (mcg)	70.6
	Vitamin D(I.U.)	53.8
	Riboflavin(VitaminB2),(mcg)	0.12
	Thiamin(Vitamin B1), (mcg)	70.6
	Biotin (mg)	2.69
	Vitamin E(I.U.)	1.77
	Vitamin K(I.U.)	1.7
	Pantothenic acid(mg)	0.44
	Vitamin B6 (mg)	48
	Folic acid (mg)	14.2
	Vitamin C (mg)	10.9
	Niacin, (mcg)	0.86

CONCLUSIONS

Milk composition is different depending on the species of mammals; cow and goat formula varies widely with human breast milk formula. Human breast milk is less than goat and cow milk in protein content (1.2 vs 3.3, 3.5). The fat content of human milk is close to goat and cow (4 vs 3.8, 3.6). Human milk contains significantly higher lactose content and calories than goat and cow.

The nutritional value of goat milk and cow's milk is not significantly different, but the volume of fat globules is smaller for goats' milk, which increases digestion of goat's milk, and the protein of goat milk presents a higher nutritional value of utilization than that of cow milk.

Goat milk and cow's milk may contain higher mineral content than breast milk, but still cannot replace human milk in young children but could complement it. Breast milk feeding should be encouraged, and the formula used should be equal to breastfeeding [15, 16]

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