DIFFERENCE CONTENT OF CALCIUM IN SUFFY PURE GOAT MILK AND COW MILK - A PRELIMINARY STUDY

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Abstract: The purpose of this study is to compare the calcium content of goat milk and cow milk in order to determine the ideal milk for pregnant women. Both goat milk and cow milk are dissolved in nitric acid to ensure that the milk completely dissolves and calcium ions are released from the organic matrix. The technique employed in this study for quantifying calcium content in milk samples was Flame Atomic Absorption Spectroscopy (FAAS). The findings of the investigation indicate that goat's milk has a higher calcium content compared to cow's milk, hence positioning goat's milk as a more favourable option for expectant mothers.

Keywords: *Goat milk, Cow milk, Pregnant women, Calcium, FAAS*

INTRODUCTION

The significance of maternal nutrition in promoting a healthy pregnancy is an important factor that should be highlighted during prenatal consultations. During pregnancy, appropriate nutrition is essential for the growth and development of the fetus as well as for the health of the mother. In addition, it is important to note that the nutritional decisions made during this time can have long-term effects on the health of both the mother and her offspring. A substantial proportion of expectant women rely on their healthcare providers, such as obstetricians, midwives, and general practitioners, for nutrition-related advice during routine prenatal visits. Only a minority of expectant women actively seek assistance from dietitians, which is notable. Despite the substantial quantity of information delivered during prenatal visits, nutrition recommendations are frequently overlooked (Jamie *et. al*., 2022).

It is recommended that pregnant women place emphasis on the quality of their diet and are advised to select meals that are high in nutrients, vitamins, and minerals. Calcium is regarded as an essential nutrient for expectant women and also lactating women because it facilitates the development and growth of the fetal skeletal system, including bones and teeth (Inmaculada *et. al*., 2008). More attention is being paid to how the health of the mother's and baby's bones affects the ability of pregnant and lactating women with low calcium diets to control where calcium goes in the body and how rapidly it leaves the bones. A low calcium intake during pregnancy has been linked to a deficiency of mineral in the bones of newborns. Inadequate calcium intake during pregnancy may also impact the length of the femur of the fetus and the bone mass of pregnant adolescents (Kimberly *et. al*., 2006).

Milk and dairy products are the richest sources of calcium found in nature. Their ingestion improves the nutritional quality of the human diet during the growth phase since they contain a high concentration of bioavailable calcium and other vital elements (Inmaculada *et. al*., 2008). The most common source of calcium consumed by expectant women is milk. According to studies, because goat's milk contains more protein and calcium than cow's milk, it is more beneficial for pregnant women (Heinlen, 2004; Widson *et. al.*, 2023). Based on the findings of that research, this reseacrh aimed to explore the calcium content in Suffy pure goat milk and cow milk (brand X) This study employs non-specialized milk intended for pregnant women, as there is no market for goat's milk tailored specifically for pregnant women.

METHODOLOGY

Sample collection and preparation

Suffy Dairy Group Sdn. Bhd. offers a supply of pure goat milk, whilst brand X cow's milk may be obtained from a nearby store. The goat and cow milk used in this research are not specially formulated for pregnant women, as the study will continue with a goat milk formulation designed specifically for pregnant women. This is due to the fact that goat's milk specially formulated for pregnant women has not yet hit the market. Both goat's milk and cow's milk are dissolved in nitric acid at a concentration of 35%. The mixture is stirred and heated to 80 degrees to ensure that the milk completely dissolves and calcium ions are released from the organic matrix. Afterward, the mixture is cooled and filtered through a 25mm PP microfilter.

Preparation of standard solution

Five calcium standard solutions with concentrations ranging from 1 to 5 ppm have been prepared by diluting a 1000 ppm calcium stock solution. Each of the five standard solutions was diluted with 1 percent nitric acid.

Standard solutions and samples anaylysis

Five standard solutions with concentrations between 1 to 5 ppm and milk samples are then analysed using Flame Atomic Absorption Spectroscopy (FAAS). Calcium analysis in both goat and cow milk utilising flame atomic absorption spectroscopy with a standard calibration procedure in which the concentration of the milk sample is calculated based on the concentration of the standard solution.

FINDINGS

This study examines the calcium concentration in Suffy pure goat milk sourced from Suffy Dairy Group Sdn. Bhd and cow milk obtained from a local supermarket. The calcium concentration of both milk samples was determined using FAAS and the calibration curve technique. The absorption versus concentration calibration curve for calcium standard is depicted in Figure 1. The relevant concentration standards are 1, 2, 3, 4, and 5ppm. On the basis of the plotted standard calibration curve, the calcium concentration in goat milk and cow milk is calculated and tabulated in Table 1.

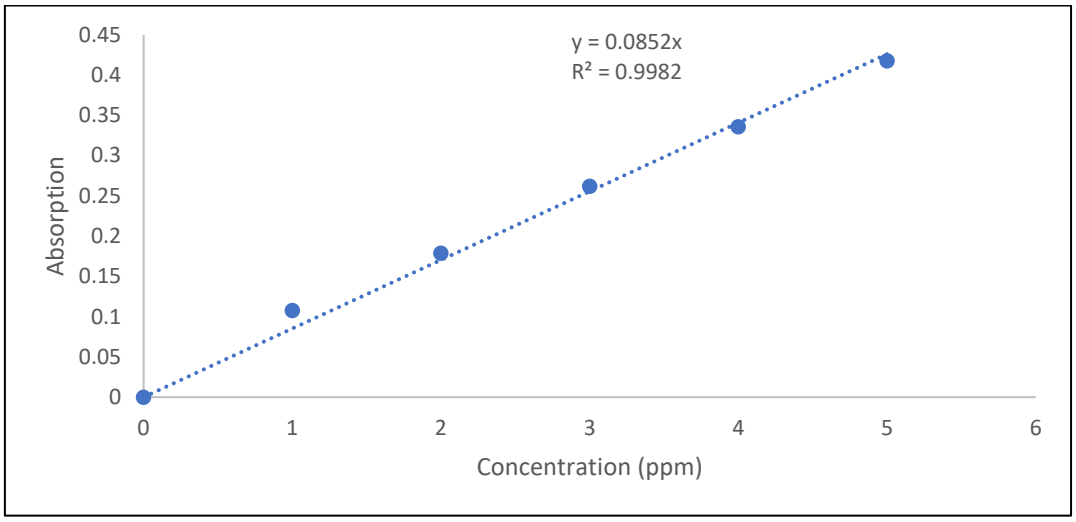

Figure 1. Standard calibration curve of calcium

Table 1. Concentration and absorbance for calcium standard, goat milk and cow milk

Sample	Concentration (ppm)	Absorbance
Standard 1	1	0.108
Standard 2	2	0.179
Standard 3	3	0.262
Standard 4	4	0.336
Standard 5	5	0.418
Goat milk	13.39	1.141
Cow milk	10.25	0.873

According to Jamie et. al (2022), The health and wellness of both the mother and the child can be positively impacted by a varied and nutrient-rich maternal diet. For the growth and maintenance of strong bones and teeth, calcium is crucial. Calcium has been demonstrated to potentially protect against hypertensive illnesses during pregnancy, such as preeclampsia, in addition to its significance in fostering bone health. For expecting women, a daily calcium intake of 700 mg for those between the ages of 19 and 64 and 800 mg for those between the ages of 15 and 18 is advised. Expectant mothers must adhere to these recommendations even though the recommended calcium intake for pregnant women is the same as for non-pregnant women in order to prevent the depletion of calcium stores, particularly bone mass, which may be necessary to meet the needs of the developing fetus.

Milk is a simple source of calcium. Current research indicates that goat's milk contains more calcium than cow's milk, making it more nutritious for expectant women. This is supported by a review conducted by Shahida et al. (2023), who found that goat's milk contains more calcium than cow's milk, with 130.4 mg/100 ml compared to 119.8 mg/100 ml. Other than that, Mg and Ca concentrations were generally greater in goat milk than those in human milk, while K and Na concentrations were comparable and Fe, Cu, and Zn concentrations were lower. According to the results of this study, goat's milk contains more nutrients than cow's milk. Therefore, goat's milk is beneficial for pregnant mothers.

Even though several precautions have already been taken, this study may still have limitations due to its hasty and inconsistent execution. Because the milks were treated with relatively high acid concentrations, it is possible that the calcium content obtained from this study for both milks is inaccurate. This may result in an inaccurate calcium concentration reading. However, the research community learns that goat's milk is superior and good for expectant women.

CONCLUSIONS

This study provides evidence that goat milk is superior to milk from cows for pregnant women. According to the findings of the present study, goat milk contains more calcium than cow milk. Since it is not currently available on the market, it is suggested for future research that a special formulation of goat's milk be produced for expectant women.

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