The Chemical Composition and Quality Analysis of Commercially Sold Milk in Hyderabad, Pakistan

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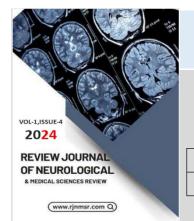**Asim Patrick[2]**
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Abstract

Bovine milk is a rich in Nutrition this biofluid is consist of hundreds of different chemically complex components. Large numbers of human populations consume milk due to its healthy benefit. It is utilized altogether various times of life i.e youth, adolescence, pregnancy, and in old age. It is useful source of Protein, lactose, fat, minerals, nutrients, and vitamins are important nutrients present in Milk. Customers undoubtedly require nutritious, healthy, and clean milk. To maintain quality, milk must have a normal chemical composition, without adulterants, and have a low amount of titerable acidity, and taste fantastic. The nutrients present in the fresh milk sold in Hyderabad was examined in this study. 12 milk tests were gathered from shops of twelve randomly selected vicinity of three towns Qasimabad, Hyderabad city and Latifabad of Hyderabad. Numerous factors, including the percentages of protein, fat, total solids, solids without fat, acidity, and specific gravity, were used to calculate the chemical composition of milk. The results for raw milk sample showed highest mean% of protein 3.46% ±0.65, fat 2.23% ±0.42, total solid 9.0 ±1.93, solid not fat 6.84 ±1.67, acidity 0.23 ±0.05 and specific gravity 1.024 ±0.00 When statistical analysis was performed on the results of milk tests, it was observed that the mean percentages of protein, total solids, non-fat solids, acidity, and specific gravity were not statistically different (P>0.05), whereas the mean percentage of fat was considerably different

(P<0.05). Significant milk components like fat, protein, total solids, and non-solid fats were significantly lower in milk sold in Hyderabad than in pure milk, demonstrating the poor nutritional nature of milk.

Keywords: Chemical Composition, Nutritional Analysis, Milk Adulteration, Dairy Products, Food Safety

INTRODUCTION

Milk is a highly nutritious food, providing essential proteins, fats, carbohydrates, vitamins, and minerals (Nagraik, 2021). As a biochemical complex, milk serves as a complete food source, consumed globally across all age groups (Garcia, Osburn, & Cullor, 2019). Over the past three decades, milk consumption has increased significantly worldwide, particularly in developing countries like Pakistan(Patari, Datta, & Mahapatra, 2022). Buffalo and cow milk, with respective protein contents of 3.8%, demonstrate the nutritional importance of milk (Fahmid, Sajjad, Khan, Jamil, & Ali, 2016). Quality milk, free from contaminants and with balanced nutrient composition, is crucial for health(Korale-Gedara, Weerahewa, & Roy, 2023). This study evaluates the chemical composition of fresh milk sold in Hyderabad markets to assess its quality.
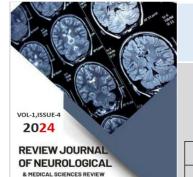
MATERIALS AND METHODS

This study was conducted (Memon, Arain, Kaka, Memon, & Arisar, 2024) Milk samples were collected from twelve randomly selected shops across three towns: Qasimabad, Hyderabad City, and Latifabad. Each sample was 200 ml. The chemical composition of the milk was analysed for protein, fat, total solids, solids-not-fat, acidity, and specific gravity using standard methods.

- **Protein** was measured by formol titration (Heath, 1978).
- **Fat** was determined using Gerber's method (Khan, 2004).
- **Total Solids** were calculated using the oven-dried method (Harding, 1995).
- **Solids-Not-Fat** were derived from total solids minus fat content (Clark, Barbano, & Dunham, 1989)
- **Acidity** was assessed by titration (POPESCU & ANGEL, 2009)
- **Specific Gravity** was measured with a lactometer (Mohd Fazla et al., 2023)

RESULTS AND DISCUSSION

The physico-chemical properties of milk samples, including protein, fat, total solids, solids-not-fat, acidity, and specific gravity, were evaluated.
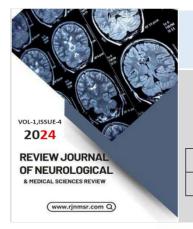
Table 1: Physico-Chemical Properties of Milk Samples from Hyderabad

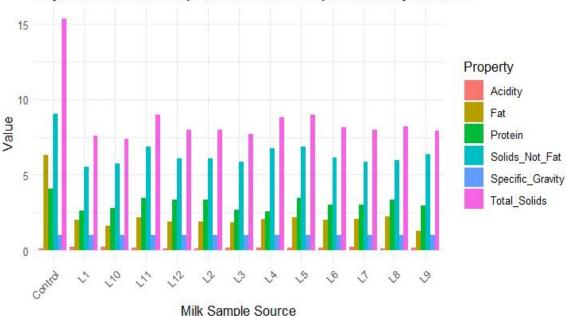| Source	Protein (%)	Fat (%)	Total Solids (%)	Solids-Not-Fat (%)	Acidity (%)	Specific Gravity
L1	2.60 ±0.79	2.02 ±0.36	7.57 ±1.93	5.55 ±1.65	0.22 ±0.06	1.022 ±0.00
L2	3.36 ±0.70	1.93 ±0.36	7.99 ±2.06	6.08 ±1.76	0.13 ±0.06	1.022 ±0.00
L3	2.70 ±0.76	1.87 ±0.27	7.72 ±1.68	5.85 ±1.42	0.17 ±0.05	1.022 ±0.00
L4	2.58 ±0.73	2.06 ±0.21	8.83 ±1.25	6.75 ±1.08	0.15 ±0.06	1.024 ±0.00
L5	3.45 ±0.65	2.16 ±0.32	9.0 ±1.93	6.84 ±1.69	0.17 ±0.04	1.023 ±0.00
L6	3.03 ±0.70	2.02 ±0.21	8.14 ±1.24	6.15 ±1.16	0.15 ±0.06	1.024 ±0.00
L7	3.03 ±0.67	2.07 ±0.57	7.99 ±2.64	5.87 ±2.07	0.21 ±0.06	1.022 ±0.00
L8	3.34 ±0.60	2.24 ±0.42	8.23 ±1.93	5.96 ±1.57	0.13 ±0.04	1.023 ±0.00
L9	2.94 ±0.85	1.3 ±0.37	7.90 ±2.49	6.38 ±2.15	0.16 ±0.07	1.022 ±0.00
L10	2.78 ±0.96	1.65 ±0.34	7.35 ±2.53	5.74 ±2.18	0.23 ±0.05	1.022 ±0.00
L11	3.46 ±0.65	2.16 ±0.32	9.0 ±1.93	6.84 ±1.67	0.17 ±0.04	1.024 ±0.00
L12	3.33 ±0.61	1.93 ±0.38	7.99 ±2.07	6.08 ±1.76	0.13 ±0.08	1.023 ±0.00
Control	4.10 ±0.38	6.30 ±0.45	15.36 ±0.80	9.06 ±0.45	0.14 ±0.01	1.031 ±0.001

Figure 1: Comparison of physio-chemical properties (protein, fat, total solids, solids-not-fat, acidity, and specific gravity) of milk samples from various locations in Hyderabad compared to a control sample.

The investigation reveals that the milk available in Hyderabad exhibits reduced levels of crucial nutrients when contrasted with unadulterated milk, indicating a decline in nutritional value. These insights highlight the necessity for effective regulatory practices and quality checks to guarantee that consumers have access to nutritionally adequate milk.
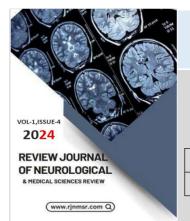
CONCLUSION

Through this study, it becomes evident that milk distributed across various parts of Hyderabad lacks essential nutrients such as fat, protein, and total solids in comparison to pure milk, signifying a compromised nutritional quality. This finding points to the urgent need for enhanced regulatory frameworks to ensure consumers receive milk that meets nutritional standards.

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