

Determination of Micro and Macro Elements and Some Biochemical Parameters in Fresh Cow Milk from Different Locations in Maiduguri Metropolis, Borno State, Nigeria

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Milk is an essential nutritional substance required for growth and development as well as food supplement to humans and animals. However, milk and milk products are considered as an important source of dietary minerals for consumers. Fresh cow milk were randomly collected from two different locations, KasuwaShanu and Bulumkutu Kasuwa within Maiduguri metropolis of BornoState, Nigeria. In this present study the concentration of the micro and macro elements (Na, Ca, Mg, Zn, Cu and Mn) was quantitatively determined using Atomic Absorption Spectrometry (AAS), while the biochemical constituents, fat and protein in the fresh cow milk were analyzed using the standard methods. The results showed milk sample C and D from BulumkutuKasuwa with highest sodium content (49.06 ± 0.02 and 41.01 ± 0.01 Mg/L) respectively, while KasuwaShanu samples A and B has the lowest (36.27 ± 0.09 and 31.61 ± 1.05 Mg/L) respectively. Calcium levels were highest (2.15 ± 0.05 Mg/L) in sample B, followed by (1.81 ± 0.01 Mg/L) in sample D and lower (1.48 ± 0.03 Mg/L and 1.40 ± 0.09 Mg/L) in samples C and A respectively. Mg, Zn, Cu and Mn were detected in all the fresh cow milk samples from the two locations KasuwanShanu and BulumkutuKasuwa and their concentrations were within NAFDAC (National Agency for Food and Drugs Administration Control) Standard values. The biochemical constituents; Protein content ranges from (7.11 ± 0.11 to $6.32 \pm 0.03\%$) in samples A and B respectively of KasuwanShanu and (7.57 ± 0.16 to $6.33 \pm 0.11\%$) in samples C and D respectively of BulumkutuKasuwa. The highest protein content was recorded in sample C of BulumkutuKasuwa and the lowest was recorded in samples B and D respectively. The fat levels ranges from ($8.46 \pm 0.05\%$ to $1.36 \pm 0.08\%$) in samples A and B respectively of KasuwanShanu and ($4.57 \pm 1.00\%$ to $3.55 \pm 0.13\%$) in C and D respectively of BulumkutuKasuwa. From the results it was observed that significant difference existed in protein and fat values while there is no significant difference in the values of micro and macro elements of the cow milk samples from the studied locations. However, the protein contents in the cow milk samples are significantly higher than the NAFDAC standard values but are within the maximum permissible standard limit. The high fat content in sample A is a source of worry and necessitates further monitoring in other areas and some caution in the rampant consumption of such milk.

Keywords: Micro and Macro elements, biochemical parameters, fresh cow milk, Maiduguri and Nigeria.