

MICRO-MINERAL CONCENTRATIONS IN FRESH VEGETABLE LEAF IN NORTHERN GHANA

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ABSTRACT

The levels of Cu, Fe, Mn and Zn in fifteen selected leafy vegetables were determined using atomic absorption spectrophotometry. The maximum and minimum concentration of Cu, Fe, Mn and Zn determined in the leafy vegetables presented as means \pm standard deviation was 2.44 ± 0.07 - 1.32 ± 0.04 ; 54.02 ± 6.34 - 21.28 ± 1.62 ; 12.03 ± 0.62 - 0.69 ± 0.09 mg/Kg respectively. The order of mineral levels in terms of magnitude was Fe>Mn>Zn>Cu. There were variations in the mineral content of the leafy vegetables analysed. **Key words:** Minerals, Copper, Iron, Manganese, Zinc

BACKGROUND AND OBJECTIVE

Micro-minerals (Copper, Cu; Iron, Fe; Manganese, Mn; and Zinc, Zn) are essential minerals which perform important biochemical functions and are needed for maintaining health throughout life. Iron (Fe) deficiency anemia for instance affects one third of the world's population (Senesse et al., 2004). Quantitative data on micro-mineral concentration in fresh vegetable leaves in Ghana is limited. The objective of this study was to determine concentrations of Cu, Fe, Mn and Zn in fresh leaves of vegetable species consumed in northern Ghana.

METHOD

The fresh leafy vegetables analyzed include: Pumpkin (*Cucurbita maxima*) leaves, Amaranth (*Amaranthus hybridus*) leaves, Sorrel (*Hibiscus sabdarifa*) leaves, Cowpea (*Vigna unguiculata*) leaves, and Cassava (*Manihot esculenta*) leaves bought from the three northern regions of Ghana. Fresh leafy vegetables were milled using stainless steel laboratory blender. The dry ashing method was used for Atomic Absorption Spectrophotometry (AAS) analysis (AOAC 2005). For each sample 3g was ashed in a muffle furnace at 550°C for 8 hours followed by acid digestion. Buck Scientific 210VGP Flame Atomic Absorption Spectrophotometer (Buck Scientific, Inc. East Norwalk, USA) was used to read the absorbance at appropriate wavelengths, of the metals of interest in the sample solution.

Table 1. Variations in micro-mineral content of leafy vegetables in mg/Kg wet weight

Rep	Species	Cu	Fe	Mn	Zn
1	Amaranth leaves	1.93±0.16 ^{af}	54.02±6.34 ^m	5.71±0.39 ^{af}	5.87±0.88 ^{ab}
2	Amaranth leaves	1.64±0.16 ^{cde}	63.35±2.06 ^{kl}	2.39±0.09 ^f	2.82±0.22 ^{vy}
1	Sorrel leaves	1.32±0.04 ^{ab}	49.42±4.70 ^m	8.77±0.04 ^v	2.62±0.22 ^{vy}
2	Sorrel leaves	1.67±0.08 ^{cde}	50.65±0.78 ^{mn}	11.68±3.02 ^v	2.89±0.23 ^{vy}
3	Sorrel leaves	2.29±0.01 ^{gh}	23.47±2.54 ^p	5.32±0.21 ^{af}	0.69±0.09 ^e
1	Cowpea leaves	1.81±0.09 ^{def}	50.61±0.93 ^{mn}	12.03±0.62 ^v	4.48±0.28 ^{yz}
2	Cowpea leaves	2.24±0.09 ^{gh}	80.67±6.10 ^j	5.96±0.41 ^{af}	9.21±1.62 ^c
1	Cassava leaves	2.01±0.26 ^{fg}	34.71±6.64 ⁿ	20.31±1.01 ^w	2.40±0.25 ^d
2	Cassava leaves	2.33±0.23 ^h	57.75±4.49 ^{lm}	4.54±0.49 ^{af}	6.84±0.99 ^{ab}
1	Pumpkin leaves	1.64±0.78 ^{cd}	70.63±1.51 ^k	9.00±0.09 ^u	9.38±1.31 ^c
2	Pumpkin leaves	1.84±0.11 ^{def}	72.99±1.25 ^j	21.28±1.62 ^w	8.87±0.54 ^{bc}
3	Pumpkin leaves	1.50±0.06 ^{bcd}	49.64±0.68 ^m	7.38±0.30 ^{af}	3.36±0.55 ^y

Results are presented as means \pm standard deviations. Superscript to figures in the same column represent significant or insignificant differences at $p \leq 0.05$ (ANOVA Duncan test $p \leq 0.05$). Results are on wet basis

Fig 1. Mean concentrations of Cu in leafy vegetables and standard errors.

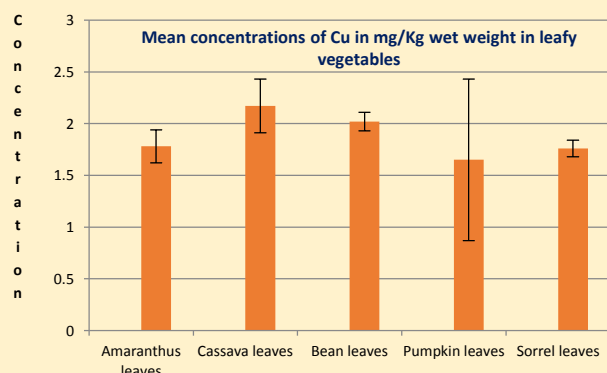


Fig 2. Mean concentrations of Fe in leafy vegetables and standard errors.

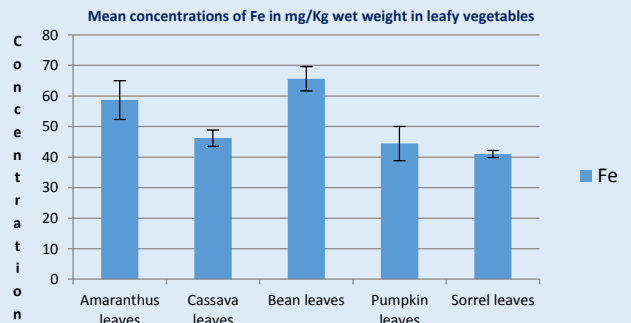


Fig 3. Mean concentrations of Mn in leafy vegetables with standard errors.

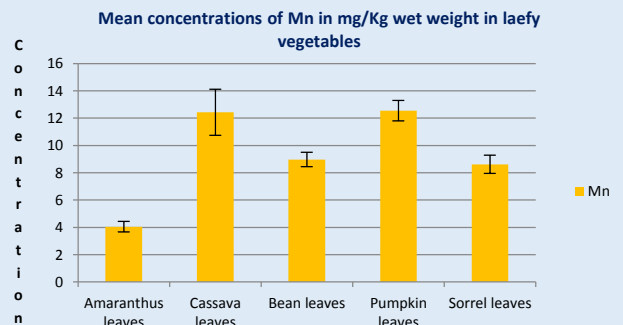
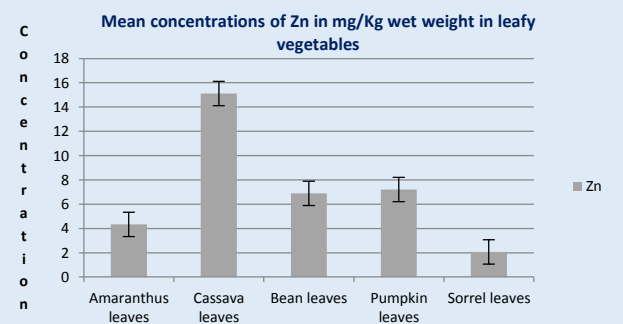


Fig 4. Mean concentrations of Zn in leafy vegetables with standard errors.



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