

Mineral Nutrients and Metabolism: Data on Nigerian Local Dishes



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Summary

Representative samples of 25 locally consumed Nigerian foods were analyzed for sodium, potassium, magnesium, calcium and iron content using flame atomic absorption spectrophotometry.

Sodium content ranged from 21.6 mg/kg for Eba & Okro to 5.1 mg/kg for Amala lafun. The potassium content ranged from 11.2 mg/kg for Eba & Okazi to 4.6 mg/kg for Wanke. Magnesium content ranged from 10.0 mg/kg for Eba & Okazi to 4.2 mg/kg for Yam & Egg omelet. Iron content ranged from 22.2 mg/kg for Yam pottage & beans to 6.3 mg/kg for Jollof rice. Calcium ranged from 19.8 mg/kg for Vegetable to 7.1 mg/kg for Beans & Plantain.

With the exception of iron, the dishes were deficient in sodium, potassium, magnesium and calcium relative to the Recommended Daily Allowance (RDA).

The study outlined broad variations in mineral availability and indicated that the essential mineral contents of dishes analyzed were very poor. This constitute a high risk for malnutrition and/or hidden hunger as well as diet / metabolism-related diseases among Nigerian population.

Introduction

Virtually all biochemical processes in the body require dietary mineral nutrients as co-factors in several enzyme reactions. Deficiency in any of these essential of the diet have the potential to impair metabolic activities. A classical example is the relationships between goiter and lack of iodine as well as stunting and lack of Zn.

Appropriate dietary intake of these mineral nutrients can address this deficiency and is currently recommended as part of a lifestyle intervention for the prevention of many metabolism-related health problems including diabetes, obesity, high cholesterol and insulin resistance.

In Nigeria, avoidable mineral nutrient deficiencies impact well-being and are pervasive especially among small children and pregnant women (UNICEF 2009). Moreover, it is unknown if Nigerian local dishes suffice to meet the WHO Recommended Daily Allowance (RDA) for mineral nutrients.

Given the lack of adequate data on the mineral adequacy of our local dishes for optimal health, the present study was designed to analyse the mineral composition of local dishes that are widely consumed in Nigeria.

Methods

Sample Collection: A list of twenty-five (25) local foods commonly consumed in Nigeria was generated, primary samples collected and composite sample prepared for each food. Primary samples were collected from 3 heterogeneous sources (household; local / ethnic canteens; and upscale restaurants).

Moisture content determination: Done by drying the samples to dry weight in an electric oven at 110 °C. Moisture content was then calculated as % water loss.

Mineral analyses: The sodium, potassium, magnesium, calcium & iron content of all food composite samples were determined on aliquots of the solution of the ash by flame atomic absorption spectrophotometry (AOAC, 1990).

Duplicates of samples were analyzed for homogeneity of portion sampled from the food and reproducibility of method.

Dish	Main Ingredients
Eba & Okro	Cassava flakes, Okra, Pepper
Pap & Moin-moin	Corn flour, Beans, Groundnut Oil, Onion
Amala & Gbegiri	Yam flour, Beans paste, Pepper, Palm Oil
Fufu & Banga	Cassava flour, Palm fruit, Bitter leaf, Onion
Rice & Bean	Rice, Beans, Tomato, Pepper
Yam pottage & Bean	Yam, Tomato, Pepper, Onion, Beans, Palm Oil
Tuwo Chinkafa	Rice flour
Pounded Yam & Egusi	Yam, Melon, Vegetable, Onion, Palm Oil
Vegetable Soup	Vegetable, Pepper, Palm Oil, Locust bean, Dry fish
Bean & Plantain	Beans, Tomato, Banana, Onion
Jollof rice	Rice, Tomato, Carrot, Groundnut Oil, Pepper, Onion

Table 1: Description of selected foods commonly consumed in Nigeria

Results

Dish	MC (%)	Na	K	Mg	Ca	Fe
Eba and Okro Soup	76.8±2.2	21.6±0.2	7.7±0.1	9.6±0.1	10.1±0.1	10.0±0.2
Ogbono Soup	75.6±1.7	17.0±0.5	7.2±0.2	5.7±0.2	7.3±0.2	7.5± 0.1
Rice & Beans	74.5±1.3	11.0±0.2	7.65±0.1	9.7±0.1	13.7± 0.1	24.0±0.9
Yam porridge & Bean	76.0 ± 1.2	17.4±0.4	6.9±0.2	8.1±0.3	14.8±0.2	22.2± 0.5
Wanke	78.0±0.3	13.0±0.6	4.6±0.3	6.5±0.3	10.1±0.3	12.2± 0.2
Eba & Okazi Soup	85.0±1.4	9.0±0.2	11.2±0.5	10.0±0.2	14.2±0.5	19.6±0.5
Tuwo Shinkafa	92.2±0.8	6.8±0.3	10.8±0.1	8.9±0.2	10.3±0.5	8.9± 0.1
Waina	73.8±0.6	8.6±0.3	10.6±0.3	5.0±0.1	11.9±0.7	14.8±0.6
Akara	75.0±0.3	16.7±0.8	8.2±0.4	6.3±0.3	8.21±0.3	9.9±0.2
Edikiakong Soup	87.6±1.0	14.0±0.3	6.8±0.2	7.7±0.1	8.1± 0.1	7.9±0.4
Pap & Moin-moin	86.2±0.8	5.9±0.2	8.9±0.2	2.4±0.3	9.6±0.2	10.6±0.4
Pounded Yam & Egusi	75.2±2.2	12.0±0.4	6.0±0.2	8.6±0.2	7.4±0.2	9.8±0.1
Jollof Rice	54.6±2.0	10.6±0.2	9.2±0.2	5.0±0.1	7.6±0.4	6.3±0.3
Fufu	86.4±1.0	5.9±0.3	10.0±0.1	5.1±0.1	11.2± 0.2	16.9±0.6
Yam & Egg Omelet	69.2±1.1	5.0±0.2	7.9±0.2	4.2±0.2	7.1± 0.8	10.3±0.7
Amala & Gbegiri	81.6±1.5	10.6±0.3	8.0±0.2	5.0±0.4	7.6±0.3	9.5±0.4
Beans & Plantain	73.2±0.4	13.8±0.4	7.9±0.2	4.2±0.2	7.1±0.1	9.3± 0.3
Fufu & Banga Soup	72.4±0.5	7.9±0.5	9.2±0.3	4.1±0.1	10.3±0.1	9.4±0.3
Ikokore	74.4±2.7	6.9±0.2	9.0±0.3	5.2±0.1	10.5±0.3	11.6±0.4
Ofada Rice & Stew	84.4±1.3	6.8± 0.2	10.2±0.2	7.0±0.1	10.9±0.1	10.0±0.2
Amala & Ewedu Soup	79.4±0.5	11.2± 0.1	5.2±0.18	8.4±0.2	8.1±0.5	11.2±1.3
Amala lafun	73.2±0.4	5.1±0.4	7.5±0.3	5.4±0.2	14.6±0.4	11.5±0.3
Onugbu Soup	86.8±1.0	9.2±0.3	9.6±0.3	4.4±0.5	12.7±0.6	17.7±0.8
Semovita & Miyan-kuka	84.0±0.4	9.2±0.1	5.5±0.2	6.0±0.3	10.8±0.2	9.3±0.2
Vegetable Soup	81.6±1.5	±	6.7±0.3	5.4±0.2	19.8±0.1	10.4±0.3

Table 2: Mineral composition of commonly consumed local foods in Nigeria. Values expressed as mg/kg dry weight and are means of 6 determinations.

RDA	Na	K	Mg	Ca	Fe
Male	1500*	4700*	420	1000	8
Female	1500*	4700*	320	1000	18

Table 3: Nutritional recommendations for selected minerals according to Dietary Reference Intake. *AI = Adequate Intakes; Values are in mg/day.

Conclusion

The study outlined broad variations in mineral availability and indicated that the selected mineral contents of foods analyzed were very poor.

With the exception of iron, the dishes were deficient in sodium, potassium, magnesium and calcium relative to the Recommended Daily Allowance (RDA).

This constitute a high risk for malnutrition and/or hidden hunger as well as diet / metabolism-related diseases among Nigerian population.

The study provides relevant baseline data for dieticians, clinicians and health professionals for provision of dietary advice for preventing the risk of deficiency and diet-related diseases.

REFERENCES

- AOAC (1990). Official methods of analysis of the Association of Analytical Chemists. 15th ed. Arlington, Virginia.
- Institute of Medicine (2004). Dietary Reference Intakes: Recommended intakes for individuals, Washington DC: National Academy Press.
- UNICEF (2009). Tracking progress on child and maternal nutrition.

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