

Short Communication

Iodine contents of some selected roots/tubers, cereals and legumes consumed in Nigeria

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Some selected staple foods: tubers, cereals, and legumes, grown, sold and consumed in Ijebu-North Local Government area, Nigeria were evaluated for their iodine content using standard methods. Among the tubers, *Ipomea batata* (sweet potatoe, red species) was observed to have the highest iodine content (311.33±8.52 µg/l) while the least iodine value of 88.97±1.31 µg/l was recorded in *Discovea avenmensis* (cocoyam). Among the cereals, maize was observed to have the highest iodine content (100.96±3.50 µg/l). When the iodine content of the legumes was compared, the highest was observed in *Glycine soja* (soybean; 179.56±4.66 µg/l) while the least was in *Cucur melo* (mellon; 29.84±1.21 µg/l). Result from our findings indicated that most of the staple foods contain high level of iodine.

Key words: Iodine, cereals, tubers, legumes.

INTRODUCTION

Iodine deficiency disorders (IDD) is a public problem affecting more than 740 million people throughout the world. Previous reports indicated that almost two billion people have insufficient iodine intake as measured by urinary excretion below 100 µg/L (WHO, 2003; Anderson et al., 2005). It has been reported that 141 millions of people in Europe were at risk of IDD, 97 millions had an impaired mental development due to iodine deficiency (Vitti et al., 2001). Salt iodization has been proven to be effective in the treatment and prevention of IDD (Lamberg, 1985; WHO/NUT, 1994). Almost 70% of households in the world use iodized salt (UNICEF, 2007) but not without its attendant problems of recurrent cost delivery network, storage ability (Babikir, 1994) and some health implications (Feid-Ramussen, 2001). Studies have shown the possibilities of adverse effects of salt iodization in some communities that were previously living in iodine deficient area (Delange et al., 1999) and consumption

above tolerable upper intake level of iodine in individual living in iodine sufficient area (Laurberg et al., 2001). In such situations, alternative methods of IDD prevention such as iodization of water for irrigation (Xue-Yi et al., 1994) and selection of iodine dense plants for breeding and consumption may be necessary for this category of people who may not benefit from iodized salt either for health or other reasons.

Plants such as roots, tubers, cereals and legumes are staple foods of many communities, particularly in Nigeria. Some of these plants are able to fortify themselves with micronutrients, thereby developing higher doses of such nutrients in their tissues (Howarth, 1999). The knowledge of such plants would enable careful selection for consumption and breeding where there is problem with salt iodization. One of the steps in achieving this goal is to screen those plants that are grown and consumed in a particular geographical location for their iodine content so as to establish those plants that can concentrate sufficient amount of iodine and that can be recommended for consumption in order to prevent the symptoms of iodine deficiency disorder in such locality.

In view of the above, we set to investigate iodine con-

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Table 1. Iodine and moisture content of roots and tubers grown and consumed in Ijebu- North Local Government Area.

Botanical name of plant	English name or local name	Iodine content ($\mu\text{g}/100\text{ g}$ edible portion)	Moisture content (%)
<i>Ipomea batata</i>	Sweet potatoe (white variety)	311.33 \pm 8.52 ^a	59.18 \pm 3.21
<i>Manihot esculenta</i>	Cassava tuber	247.07 \pm 4.32 ^b	58.53 \pm 2.52
<i>Discorea rotundata</i>	White yam	207.42 \pm 4.81 ^b	68.55 \pm 3.62
<i>Ipomea batata</i>	Sweet potatoe (red variety)	169.70 \pm 3.67 ^b	63.52 \pm 2.81
<i>Discorea alata</i>	Water yam tuber	119.07 \pm 4.53 ^c	72.55 \pm 4.43
<i>Xanthasoma</i> spp.	Cocoyam	88.97 \pm 1.31 ^d	71.00 \pm 0.60

Values are mean of six determination \pm SD.

Values in the same column with different superscript are significantly deferent ($p < 0.05$).

Table 2. Iodine and moisture content of cereals and legumes grown and consumed in Ijebu- North Local Government Area.

Botanical name of plant	English name or local name	Iodine content ($\mu\text{g}/100\text{ g}$ edible portion)	Moisture content (%)
<i>Glycine soja</i>	Soybean	179.56 \pm 4.66 ^a	11.38 \pm 1.21
<i>Zea mays</i>	Maize (yellow)	100.96 \pm 3.50 ^b	10.05 \pm 0.88
<i>Vigna unguiculata</i>	Cowpea	98.71 \pm 3.45 ^b	11.15 \pm 1.33
<i>Arachis hypogea</i>	Groundnut	94.36 \pm 2.40 ^b	21.12 \pm 1.30
<i>Oryza sativa</i>	Rice	35.38 \pm 1.20 ^c	19.40 \pm 1.00
<i>Cucumis melo</i>	Melon	29.84 \pm 1.21 ^d	31.28 \pm 1.26

Values are mean of six determination \pm SD.

Values in the same column with different superscript are significantly deferent ($p < 0.05$).

tent of some selected roots, tubers, cereals and legumes grown, sold and consumed in Ijebu North Local Government area of Nigeria.

MATERIAL AND METHODS

Plant samples used in the study were bought from two major markets in the local government area. Three samples were randomly selected from each market. The weight of the samples ranges from 0.5 to 1 Kg. The samples were identified at the Herbarium of the Plant Science and Zoology Department, Olabisi Onabanjo University Ago- Iwoye. Edible portions were prepared from the samples. Each sample was thoroughly mixed and divided into six parts.

Thirty (30 g) of sample were taken into a 200 ml crucible dried in oven at temperature of 105°C for twenty four hours and the moisture content was determined. Six replicate of each sample was analyzed. The iodine content was analyzed by Elmshie Coldwell's method as modified by Diosandy and Fitzgerald (1983).

The experimental design was completely randomized. Data were analyzed using the SPSS. Significant difference between the data was determined at $p < 0.05$ using Duncan multiple range test.

RESULTS AND DISCUSSION

The results for iodine and moisture content of selected roots and tubers analyzed are shown in Table 1. The results indicate that significant difference ($p < 0.05$) exists

in the iodine contents of roots and tubers commonly consumed in the locality. The iodine value of 311.33 \pm 8.52 $\mu\text{g}/100\text{ g}$ observed in *Ipomea batata* was the highest among the root and tubers consumed as analyzed in this study, whereas *Xanthasoma* spp. was observed to have the least iodine content (88.97 \pm 1.31 $\mu\text{g}/100\text{ g}$). The iodine content observed in the white variety of sweet potatoes was significantly higher than that observed in the red species. Similarly, *Discorea rotundata* (white yam) was observed in this study to concentrate higher iodine content (207.42 \pm 4.81) compared with the water yam (119.07 \pm 4.53). When the results of the iodine and moisture contents of selected cereals and legumes were compared, no significant difference was observed in the iodine content of *Zea mays*, *Vigna unguiculata* and *Arachis hypogea* (Table 2). Among the legumes, the highest iodine content was observed in *Glycine soja* (179.56 \pm 4.46 $\mu\text{g}/100\text{ g}$). Consumption of 200 g edible portion of *G. soja* or any of these roots/tubers except *Xanthasoma* spp. would yield more than 200 μg iodine, which is the required dietary allowance (Committee on Dietary Allowance, 1980) of an adult.

The difference in concentration of iodine measured in these plants shows the ability of different plant to concentrate micronutrient at different levels (Howarth, 1999) given the same geographical condition. Careful

selection of these plants with high concentration of iodine could be beneficial for those whose salts intake is low either due to health reasons such as hypertension (Stephen and Hoptron, 2006). Those plants with low iodine content are not without benefit. In iodine deficient areas, where introduction of iodine salt may trigger hyperthyroidism (Barbara, 1994), careful selection of plants low in iodine content such as *Xanthosoma* spp., *Oryza sativa* and *Cucumis melo* could be beneficial. The iodine content of the food could not be taken as absolute because the iodine content of plant is also a function of the soil content (Matovinovic, 1983, Kontras et al, 1985, Babara, 1994) and the availability of the iodine is dependent on other inherent constituents of the plants such as goitrogen in *Manihot esculenta* (Benmiloud et al., 1983), Glycine soja (Onabolu et al, 1992) as well as processing method (Vitti et a, 2001) which may affect iodine content.

Conclusion

We have provided information on the iodine content of some selected roots, tubers, cereals and legumes generally consumed in Ijebu North Local Government Area. Individuals living in this community will be properly guided in the selection of plants to be consumed based on his/her iodine status.

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