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Evaluation of Nutritional Compositions of Healthy and Infected Dried Tomato Chips Sold in Sokoto Metropolis, Sokoto State, Nigeria

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ABSTRACT

Tomatoes are consumed widely throughout the world. The edible part of the fruit is known as the power house of nutrition. Protein and mineral deficiencies are serious public health problems, therefore, there is need to explore possible source of protein and mineral to help overcome malnutrition. The quality of tomato is determined by colour, appearance, flavour and firmness. The aim of the study was to determine the proximate and mineral compositions of healthy and infected dry tomato chips sold in Sokoto State. The proximate composition (moisture, ash and protein) was determined by standard AOAC methods and minerals (calcium, magnesium, sodium, potassium, iron, zinc, copper and manganese) by atomic absorption spectrophotometer. This investigation showed that the moisture and the lipid content of the infected sun-dried tomato chips significantly increased over the healthy ones. However, the protein, ash, fiber and carbohydrate content of the infected chips were lower than that of the healthy ones. All the minerals (Na, K, Ca, Mg, and P) evaluated were discovered to be in higher concentration in the healthy dried fruits compared to the infected ones. These data are important for the nutritional advice in the North part of Nigeria who mostly uses dried tomato as recipes.

Keywords: Tomato, proximate, mineral composition, sundried chips.

INTRODUCTION

Tomato (*Solanum lycopersicum*) is a major crop plant and a model system for fruit development. Globally, the tomato is one of the most important and recognized vegetable crop. It is comparatively a short duration crop and produces more output per unit area of cultivation, and it ultimately plays a significant role in promising a well-balanced diet (Van *et al.*, 2005). It is a very good source of vitamins, minerals, sugars, essential amino acids, and dietary fibers (Ugonna *et al.*, 2015). According to FAOSTAT (2014) global production of tomatoes is about 4.8 million hectares of land area and a yield of about 162 million tons. However, in Africa, Nigeria realized the lowest yield of production, which is about 4.0MT/Ha compared to South Africa and Egypt that recorded 78MT/Ha and 38.7MT/Ha respectively (FAOSTAT, 2014). Nevertheless, Ugonna *et al.*, (2015) attributed the reasons for such bottommost yield to the lack of critical inputs, technological development, storage and processing facilities, poor marketing structure as well as high postharvest losses.

Nigeria, with a population of above 170 million, it is apparent that the demand for tomatoes overshadows the supply. The challenge is attributed to the seasonality, perishability, and inadequacies in post-harvest handling of the vegetable (Arah *et al.*, 2015; Adenegan and Adeoye, 2011). Thus accounts for 40-50% loss annually (Adegbola *et al.*, 2012). As a result, dried tomatoes provide an economical alternative to fresh ones; because dried tomato is more durable, and requires no additives, and is produced by direct sun-drying (Abdulmalik *et al.*, 2014). Moreover, water removal prevents oxidative and enzymatic

reactions, thus significantly increasing product shelf-life (Sagar and Kumar, 2010). Though, the finished product is obviously infested with sand and filth, thus making it hypothetically harmful for ingestion when improperly cooked. Nevertheless, the objective of this study was to determine the proximate analysis and mineral composition of the product of the dried tomato samples in Sokoto State.

MATERIALS AND METHODS

Study Area

Sokoto State geographically lies along longitude 11^0 30^1 to 130 50^I East and latitudes 4^o to 6^1 North and covers a total land mass of 26,648.48 square kilometers. Sokoto State shares boundary with Kebbi State to the south, Zamfara State to the east and the Republic of Niger to the north. The State has an estimated population of about 4,742,459 people as of 2015 with 95.9 persons per square kilometer, and 3% growth rate annually based on 2006 population census (NPC, 2007). Occupation of the city inhabitants includes farming, trading; commerce, with a reasonable proportion of the population working in private and public sectors (MOCIT, 2002)

Collection of samples

Healthy and infected sun-dried tomato chips were randomly selected from five different markets, namely; Kofar Rini, Marina, Tsohuwar Kasuwa, Unguwar Rogo, and Kasuwar Dankure located in Sokoto State, Nigeria. The tomato chips were put into sterile bags and properly labeled and taken to laboratory for analysis.

Proximate analysis

The moisture content was determined by drying fresh sample in an oven at 103°C until constant weight, ash by incineration in a muffle furnace at 550°C for 48 h, protein by nitrogen determination using the Kjeldahl micro method and conversion of nitrogen to protein by the factor 6.25 (AOAC, 2005).

Mineral determination

The method described by AOAC (2005) was used for mineral analysis. The sample was ashed at 550°C and the ash boiled with 10 ml of 20% HCl in a beaker and then filtered into a 100 ml standard flask. The minerals (calcium, magnesium, sodium, potassium, iron copper, zinc and manganese) were determined by atomic absorption spectrometer (Varian 220FS Spectr AA, Les Ulis, France).

RESULT AND DISCUSSION

Both healthy and the infected tomato chips were subjected to proximate analysis as shown in Table 1. The result indicated that the moisture and the crude lipid content of the infected tomato chips increased from 10.5 – 14.5% and 0.7 – 6.3% respectively. However, the crude protein, fiber, ash and carbohydrate decreased from 8.46 – 3.70%, 1.8 – 0.5%, 14.2 – 2.7%, and 86.80 - 84.84% respectively in infected tomato chips. The main purpose of drying is to reduce the rate of microbial growth by reducing the water content of the fruit, which in turns helps in preserving the quality of the content.

Table 1: Proximate composition of healthy and infected tomato chips

Parameters	**Dried Tomato Chips**	
	Healthy (%)	**Infected** (%)
Moisture	10.5	14.5
Protein	8.46	3.70
Ash	14.2	2.7
Lipid	0.7	6.3
Fiber	1.8	0.5
Carbohydrate	86.80	84.84

The result of proximate and mineral analysis of dried tomato chips shows that there is a significant difference in the nutritional and mineral analysis between infected and healthy dried fruits. The mineral analysis of this study (Table 2) revealed that the healthy sun-dried tomato chips have ahigher concentration of all the minerals compared to the infected ones. These findings are in line with those

Fagbohun *et al.*, (2010), who reported an increase in all the minerals found in their work except phosphorus. The decrease in minerals content in infected tomato chips depends on the severity of the infection, the difference in storage, and processing as well as the physiological and physical condition of the produce and extrinsic parameters to which they were subjected. Therefore, improper handling of the fruits makes them easily susceptible to fungal attack leading to decrease in the nutritional or mineral content of the fruits.

Table 2: Mineral composition of healthy and infected tomato chips

Composition	**Dried Tomato Chips**	
	Healthy	**Infected**
Sodium	245	20
Potassium	980	500
Calcium	0.65	0.50
Magnesium	0.35	0.15
Phosphorus	3.61	2.54

The increase in moisture of the infected tomatoes could be because it (moisture) is indispensable for microbial functions. It could be academically accepted that the infected tomato chips have high microbial content compared to the healthy ones; thus holds more water content. This finding is contrary to that of Toma and Rajab (2014) who concluded that low water activity in dried fruits aids the development of Aspergillus species.This implies that the duration of storage and drying plays an important role in moisture retention in the fruit. Likewise, the lipid content increased from 0.7 (healthy dried fruits) to 6.3 (infected dried fruits). The protein content decreased from 8.46 to 3.70, which is contrary to the findings of Fagbohun and Lawal, (2011); Fagbohun *et al*., (2010). The decrease in protein could be attributed not only to microbial activity but also the duration of storage (Fagbohun *et al*., 2011). The ash content of dried tomato chips obtained from this study were14.2% and 2.7% for the healthy and infected fruits. This showed that there was a decrease in the ash content in the infected fruits. Nonetheless, Jorge *et* al., (2014) reported an increase in the ash content. This study also revealed the presence of 1.8% and 86.80% fiber and carbohydrate respectively in healthy dried fruits, while the infected ones recorded 0.5% and 84.84% fiber and carbohydrate respectively. These findings agree with the result of Fagbohun *et al*., (2010); Fagbohun *et al*., (2011) in sundried plantain chips and soybeans respectively.

CONCLUSION

The importance of dried tomatoes in Nigeria cannot be overemphasized and it can be concluded fro, the study that, there is need to enhance and standardize the drying process to guarantee excellent products that are free from deterioration. The study having had explore the nutritional composition of sun-dried tomato chips in Sokoto State. Thus, devising avenues for minimizing this contamination to meet the global standards of good production practices is of paramount importance. Besides, further researches are necessary to determine precisely the different constituents present in these different dishes especially amino acid and vitamins contents. These data are important for the nutritional advice in the North part of Nigeria who mostly uses dried tomato as recipes.

REFERENCES

Abdulmalik, I. O., Amonye, M. C., Ambali, A. O., Umeanuka, P. O., & Mahdi, M. (2014). Appropriate Technology for Tomato Powder Production. *International Journal of Engineering Inventions, 3*, 29-34.

Adegbola, J. A., Awagu, F., Adu, E. A., Anugwom, U. D., Ishola, D. T., &Bodunde, A. A. (2012). Investment opportunities in tomato processing in Kano, Nothern Nigeria. *Global Advance Research Journal of Agricultural Science, 1*(10), 288-297.

Adenegan, K. O., &Adeoye, I. B. (2011). Price analysis of tomato in rural and urban retail markets of Oyo State. *International Journal of Agricultural Economics & Rural Development*, *4*(2), 90-96.

Aneja, K. R. (2003). *Experiments in microbiology, plant pathology and biotechnology*. New Age International Pp. 24

Arah, I. K., Kumah, E. K., Anku, E. K., &Amaglo, H. (2015). An overview of post-harvest losses in tomato production in Africa: causes and possible prevention strategies. *Journal of Biology, Agriculture,and Healthcare*, *5*(16), 78-88.

Fagbohun, E. D., &Lawal, O. U. (2011). Effect of Storage on nutrient composition and mycoflora of sundried soybean (Glycine max). *Afri. J. Food Sci*, *5*(8), 473-477.

Fagbohun, E. D., Abegunde, O. K., & David, O. M. (2010). Nutritional and mycoflora changes during storage of plantain chips and the health implications. *Journal of Agricultural Biotechnology and Sustainable Development*, *2*(4), 61.

Fagbohun, E., Anibijuwon, I., Egbebi, O., &Lawal, O. (2011). Fungi associated with spoilage of dried cocoa beans during storage in Ekiti State of Nigeria. *The Journal of Microbiology, Biotechnology and Food Sciences*, *1*(2), 204.

Frodin, D. G. (2004). History and Concepts of Big Plant Genera. Taxon, 53(3), 753. doi:10.2307/4135449

Jarvis, B., Seiler, D. A. L., Ould, A. J., & Williams, A. P. (1983). Observations on the enumeration of molds in food and feeding stuffs. *Journal of Applied Microbiology*, *55*(2), 325-336.

Jorge, A., Almeida, D. M., Canteri, M. H. G., Sequinel, T., Kubaski, E. T., &Tebcherani, S. M. (2014). Evaluation of the chemical composition and color in long-life tomatoes (*Lycopersicon esculentum* Mill) dehydrated by combined drying methods. *International journal of food science & technology*, *49*(9), 2001-2007.

MOCIT, (2002) Guide to Sokoto states Economic Potentials. Commerce Dept, Ministry of Commerce, Industry and Tourism, Sokoto State.. Pp 4 – 18.

Nagmani, A., Kunwar, I. K., &Manoharachary, C. (2006). Handbook of soil fungi: In International Pvt. *Ltd. New Delhi, 477p*.

National Population Commission (2007). Population Census Data, Nigeria, Federal Republic of Nigeria Official Gazette, National and State Provisional Total Census, Printed and Published in Federal Government Printer, Lagos, No 21 vol.94

Sagar, V. R., & Kumar, P. S. (2010). Recent advances in drying and dehydration of fruits and vegetables: a review. *Journal of food science and technology*, *47*(1), 15-26.

Toma, F. M., & Rajab, N. N. (2014). Isolation and identification of fungi from dried fruits and study of quantitative estimation of aflatoxin. *ZANCO Journal of Pure and Applied Sciences*, *26*(4), 49-60.

Ugonna, C. U., Jolaoso, M. A., &Onwualu, A. P. (2015). Tomato value chain in Nigeria: Issues, challenges, and strategies. *J. Sci. Res. Rep*, *7*(7), 501-515.

Van Dam, B., Goffau, M. D., Van Lidt de Jeude, J., & Naika, S. (2005). Cultivation of tomato: production, processing, and marketing.