Proceedings of 30th Annual Conference of ASAN 2025, Abuja, Nigeria (782-784)

DETERMINATION OF PROXIMATE COMPOSITION OF PROCESSED MOTHERS DELIGHT ORANGE FLESHED SWEET POTATO PEELS

Nelson, S. U., Obua, B. E. and Ahamefule, F. O.

Department of Animal Production and Livestock Management, College of Animal Science and Animal Production, Michael Okpara University of Agriculture, Umudike, Abia State.

Corresponding author's email: susannelson25@yahoo.com., +2347087317651

ABSTRACT

A study was conducted to determine the proximate composition of fresh, sun-dried and fermented orange fleshed sweet potato (Ipomoea batatas L.) peels. A small quantity of the tubers of orange fleshed sweet potato was harvested from the farmland of Akwa Ibom State Ministry of Agriculture, Ikot Enwang, Ikot Ekpene Local government area of Akwa Ibom State. The fresh sweet potato tubers were washed, peeled and ground for analysis. For the sun-drying method, the sweet potato tubers were washed, peeled and sun-dried in a free environment devoid of dirt and contamination to about 5-10% moisture; thereafter, it was ground for analysis. In the fermentation method, some tubers were washed, peeled, sun dried to about 5-10% moisture and then put into an airtight container for seven (7) days. All samples were analysed in triplicate at the Biochemistry Laboratory of the University of Uyo, Akwa Ibom State. The percentage nitrogen free extract was higher ($P<0.05$) in fresh sweet potato peel (88.60 %) than sun-dried and fermented peels (64.69 % and 61.18%), higher percentage of dry matter, ash, ether extract and crude fibre content were recorded in sun-dried sweet potato peel (87.12, 13.8, 4.38 and 9.95 %respectively)while fermented method had the highest crude protein content and metabolizable energy (18.12 % and 3751.42 Kcal/gDM).

Keywords: Sweet Potato Peel, fresh, Sun-dried, fermented, Proximate Composition

Target Audience: Animal Scientists, Animal Nutritionists and Farmers,

Description of Problem

Sweet potato (*Ipomoea batatas L.*) is one of the most widely grown food crops in the world with a short vegetative cycle, and is recognised because of its vital role both in health, food security and for animal consumption (1). Sweet potato roots vary in colour, with the Orange-fleshed sweet potatoes (*Ipomoea batatas L.)* being rich in β-carotene, the most important provitamin A carotenoid. By-product of potato peel is an inexpensive and valuable material for the food processing industry for the production of economically important substances, value addition, as it contains natural antioxidants and β-caroten (2). Many livestock farmers in Nigeria use agro-industrial by-products to feed their animals due to the high cost of conventional feed ingredients (3), but they are of low nutritive value; as such, non-conventional feed stuffs like potato peels can be used to replace them.

Materials and Methods

Experimental Site

The experiment was carried out in the Biochemistry Laboratory, University of Uyo, which is located at Latitude: 5º 2' 20.2668" N and Longitude: 7º 54'34.0920" E in Akwa Ibom State, Nigeria. (4).

Collection and preparation of the sweet potato peel

A small quantity of orange-fleshed sweet potato tubers was harvested from the farmland of the Akwa Ibom State Ministry of Agriculture, Ikot Enwang, Ikot Ekpene Local Government Area of Akwa Ibom State. The fresh sweet potato

tubers were washed, peeled and milled for analysis. In the sun-drying, after washing and peeling, the beans were sun-dried in a clean environment to about 5-10% moisture and were then milled for analysis. In the fermentation method, after washing, peeling, and sun drying to about 5-10% moisture, the product was then put into an airtight container for seven (7) days. All samples were analysed in triplicate at the Biochemistry Laboratory of the University of Uyo, Akwa Ibom State, Nigeria.

Determination of Nutrient Contents

The proximate composition of orange-fleshed sweet potato peels was determined using the standard methods of the Association of Official Analytical Chemists (AOAC) in the Biochemistry laboratory, University of Uyo, Akwa Ibom State, Nigeria. Moisture content, Ash content, Crude protein, determination of fat and crude fibre were all determined using the (5) method.

Nitrogen-free extract determination: It was obtained by the difference, % NFE = 100 – (% crude protein + % crude fibre + % ether extract + % ash).

Statistical Analysis

All data obtained were subjected to a one-way Analysis of Variance (ANOVA) using SPSS version 22.0 (2013) statistical software. Differences between treatment means were separated using Duncan's Multiple Range Test option of the same software (6).

RESULTS AND DISCUSSION

The results of the proximate composition of the fresh, sun-dried and fermented peels of the potato showed significant differences ($P<0.05$) in all the parameters, as shown in Table 1. The sun-dried have higher dry matter, ash, ether extract and crude fibre contents than the fresh and fermented. On the other hand, higher crude protein (18.12%) and metabolizable energy (3751.42 Kcal/gDM) were observed in the fermented peel than in fresh and sun-dried, and none of the crude protein in this study is in line with (7) reported for potato peels. The values obtained for ash in this study for sundried and fermented (13.8 and 9.78%) are higher than 4.56 and 4.53% reported by (7) and (8). Ether extract values (1.24, 4.38 and 4.24%) is similar agree with (9) who reported a depression in fibre digestion when fat level exceeded 5-6% in ruminant rations. The crude fibre values obtained in this study (2.51, 9.95 and 6.68%) for fresh, sun-dried and fermented peels are higher than 0.6-1.9% reported by (10) for dietary fibre and are not in line with their assertions.

Table 1: Proximate Components of peels of fresh, sun-dried, and fermented Ipomoea *batatas L*

Proximate Analysis (%)	Fresh	Sun-dried	Fermented	SEM
Dry matter	29.31^{c}	87.12^{a}	52.81^{b}	8.39
Ash	3.1^{c}	13.8^{a}	9.78^{b}	1.56
Crude Protein	4.55^{c}	7.18^{b}	18.12^{a}	2.08
Ether Extract	1.24^{c}	4.38^{a}	4.24^{b}	0.51
Crude Fibre	2.51^{c}	9.95^{a}	6.68^{b}	1.08
Nitrogen Free Extract	88.60^{a}	64.69^{b}	61.18^{c}	4.31
Metabolizable Energy (Kcal/gDM)	3702.23^{b}	3507.42^{c}	3751.42^{a}	37.25

^{a,b,c} means across rows with different superscripts differ significantly at $p<0.05$, SEM: Standard Error of Mean

Conclusion and Application

1) Orange-fleshed sweet potato peels are an excellent source of calories and beta carotene, with considerable amounts of protein and other nutrients.

2) Processing it either through the sun-dried or fermented method is recommended for fish and livestock farmers to use as a source of energy in feed ration formulation for their animals to reduce the cost of production and make their venture more profitable.

REFERENCES

1) SASHA/CIP (2010): Sweet-potato for health and profit initiative. Accessed online through http//www.cipotato. org/sasha/index.html.

2) Shehzad Hussain, Ivi, Jõudu and Rajeev, Bhat (2020). Dietary Fibre from Underutilised Plant Resources—A Positive Approach for Valorization of Fruit and Vegetable Wastes, *Sustainability Journal* 12 (13) : 5401; https://doi.org/10.3390/su12135401.

3) Iyayi, E. A., Okoruwa, V. O., Babayemi, O.J., Busari, A. A. and Peters, O. F.(2003). Livestock Production Pattern of Agro Pastoralists in Peri-Urban Centres of South-west Nigeria. *Nigerian Journal of Animal Production.* 30(1):87-92.

4) Opeyemi, A. O., Nicholas, L., Simeon, O., Philip, A., Emmanuel, E.and Alexander, A. (2023). Upper -Air Meteorological Dataset for Uyo, using radiosonde.

5) AOAC. (1996). Official methods of analysis. 18th edn. AOAC International, Arlington, VA. Association of Official Analytical Chemists

6) SPSS (Statistical Package for the Social Sciences). (2013). IBM SPSS Statistics for Windows,Version 22.0.IBM Corp, Armonk, NY.

7) Faramarzi, M., Lashkarboloki, M., Kiaalvandi, S., Iranshahi F. (2012). Influences of different levels of sweet potato peels on growth and feeding parameters and biochemical responses of *Cyprinus carpio*. *American-Eurasian Journal of Agricultural and Environmental Science*, 12 (4): 449-455.

8) El-Nadi, A.S.M., Abozaid, H., and Zeinhom, M.M. (2017). Graded levels of potato peels effects as a partial replacement for corn in diet of Common carp (*Cyprinus carpio*). *International Journal of Chemical Technology Research*, 10 (2): 566-572.

9) Ocheja, J. O., Aduku, A. O., Okolo, F. A., Ikughiyi, M. A., Sule, A and Mamah, M. (2011). Proximatre composition and mineral profile of cashew nut shell: Implications for Ruminant Animal Production. *Proceedings of the 16th Annual Conference of the Animal Science Association of Nigeria.*

10) Peressini, D. and Sensidoni, A. (2009). Effect of Soluble Dietary Fibre Addition on Rheological and Bread Making Properties of Wheat Doughs. *Journal of Cereal Science*, 49: 190-201.