



# **Effect of Drying Methods on the Nutrients and Anti**nutrients Composition of African Nightshade

<u>M.E. Kazosi<sup>1, 2</sup></u>, H.D. Martin<sup>1</sup>, F. Sangija<sup>1</sup> and A. Matemu<sup>1</sup> <sup>1</sup>Department of Food Biotechnology and Nutrition Sciences, Nelson Mandela African Institution of Science and Technology. P. O. Box 447 Arusha, Tanzania

<sup>2</sup>Department of Training, Vocational Education and Training Authority, P. O. Box 1434, Arusha, Tanzania

# **INTRODUCTION**

Africa nightshade (ANS) is among African indigenous leafy vegetables, contributing substantially to food, nutritional, and medicinal benefits. The commonly consumed ANS species in East Africa are Solanum scabrum, Solanum villosum, and Solanum nigrum. They grow naturally and are also cultivated in gardens/farms. Leaves and young ANS shoots are mainly eaten for food; however, other parts such as roots and fruits are also utilized for other purposes. Lack of proper postharvest handling methods for ANS leads to high postharvest losses. Due to its **DISCUSSION** high perishability, proper handling is highly needed for improving shelf- \* The ANS is a rich source of minerals, especially calcium, iron, life. This study aimed to break seasonality, increase utilization, improve product diversification, food and nutritional security, as well as reducing 🍫 Indirect solar drying technique retained higher content of postharvest losses of ANS.

RESULTS

25

20



Fig. 8. Dried African nightshade products





### **MATERIAL AND METHODS**

Two ANS species, *Solanum* scabrum, and Solanum villosum were dried using open sun, mixed solar, and indirect solar driers.

20

15



Fig. 1. Open sun, Indirect solar and Mixed solar driers

magnesium, and zinc.

- minerals compared to other techniques.
- All drying techniques significantly reduced vitamin C, although higher vitamin C retention was observed using the Indirect solar drying technique.
- Higher retention of vitamin C in Indirect solar drying technique was attributed to low drying temperature and less sunlight penetration.
- Blanching had a significant effect in reduction of vitamin C and minerals.
- Indirect solar drying technique significantly reduced the antinutrients i.e., oxalate and phytate.

# **CONCLUSION AND FUTURE PLAN**



Fig. 2. Percentage retention of vitamin C in S. scabrum





Fig. 3. Percentage retention of Vitamin C in S. villosum



The indirect solar drying method can be recommended as the best drying technique for preserving ANS compared to other drying methods. The findings in this study will be disseminated to households, women groups, and small-scale farmers in ANS growing areas. Consequently, the study is anticipated to improve food and nutrition security.

#### **REFERENCES**

Danso, J., Alemawor, F., Boateng, R., Barimah, J. & Kumah, D.B. (2019). Effect of drying on the nutrient and anti- nutrient composition of Bombax buonopozense sepals. African Journal of Food Science. *13*(1). 21-29.

Kamga, R. T., Kouamé, C., Atangana, A. R., Chagomoka, T., & Ndango, R. (2013). Nutritional Evaluation of Five African Indigenous Vegetables. Journal of Horticultural Research, 21(1), 99–106.

Mohammed, M.I & Sharif, N. (2011). Mineral Composition of Some Leafy Vegetables Consumed in Kano, Nigeria. Nigerian Journal of Basic and Applied Science, 19(2):208-212.



90

Traoré, K., Parkouda, C., Savadogo, A., BaHama, F., Kamga, R., & Traoré, Y. (2017). Effect of processing methods on the nutritional content of three traditional vegetables leaves: Amaranth, black nightshade and jute mallow. Food Science & Nutrition, 5(6), 1139–1144.

#### ACKNOWLEDGMENTS

The authors acknowledge the financial support from the Centre for Research, Agricultural Advancement, Teaching Excellence and Sustainability (CREATES) project and Fruit and Vegetable for all Session (FruVaSe) project, funded by the German Federal Ministry of Food and Agriculture (BMEL).

Fig. 6. Percentage reduced of oxalate and phytate in S. scabrum

Fig. 7. Percentage reduced of oxalate and phytate in S. villosum

Key:

90

- Indirect solar drying technique (INB-Non blanched; IWB-Water blanched; ISB-Salt blanched)
- Mixed solar drying technique (MNB-Non blanched; MWB- Water blanched; MSB- Salt blanched)
- **Open sun drying techniques (ONB-Non blanched; OWB-Water blanched; OSB- Salt blanched)**



With support from



by decision of the German Bundestag