

Processing methods and nutritional quality of dried amaranth

(Amaranthus spp. L) leaves : A review

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1. Introduction

1.1 Background information & Motivation

- □ Postharvest losses in vegetable amaranths are high (79.0 89.5%) (Affognon et al., 2015).
- □ Amaranths (*Amaranthus* spp. L) have excellent nutritional value due to their:
 - High essential micronutrients such as beta-carotene, iron, • calcium, vitamin C and folic acid (Achigan-Dako et al., 2014).
- □ The nutrient content of five species of amaranths (Amaranthus blitum, A. cruentus, A. dubius, A. tricolor and A. viridis) were reviewed as ranging from:
 - Protein (3.2-4.6 g/100g FW), Vitamin A (1.7-5.7 mg/100g FW), Vitamin C (36-78 mg/100g FW), Calcium (270-582mg/100gFW), Iron (2.48.9 mg/100g FW) and Zinc (0.7-1.5mg/100g FW) (Achigan-Dako *et al.*, 2014).

4.2 Drying methods and Nutritional Value

- \Box Sun drying decreases vitamin C, β -carotene, protein, P and Zn in leaves and significantly increase (P < 0.05) total phenols, Ca, K, fibre content and reducing property and free scavenging ability of the dried leaves (Medoua and Oldewage-Theron, 2014).
- □ Nutrient retention (20.5- 93.8%) in solar dried leaves was generally higher than sun dried leaves (Kiremire et al., 2010). Solar dried leaves had no change in β-carotene, Fe, and Zn (Chege *et al.*, 2014).
- Given investigated the effect of sun, solar and oven drying on amaranth leaves and recommended solar dried leaves since it had a higher nutrient retention (20.5-93.8%).
- Oven dried leaves of *A. dubius* and *A.cruentus* were found to retain higher β -carotene content (Gupta et al. 2013).
- □ Amaranth leaves are highly perishable nature due to the high water content (Jayaraman and Das Gupta, 1992) and shelf-life of 1-2 days (Norman, 1992).
- Drying of leaves can prolong storage.
- Dried amaranth leaves are often used to thicken soups, stews/sauces and porridges (Mepba et al., 2007).
- □ Therefore we aimed to congregate the methods for drying vegetable amaranths, assess their effect on the nutritional composition of the dried leaves and appraise the best drying method based on the nutrient content after drying.

1.2 Purpose of research

This presentation highlights the commonly used drying methods for vegetable amaranths and their effect on the nutritional quality of dried vegetable amaranth leaves.

2. Materials and Methods

- Literature was sourced from journal articles via several databases (Web of Science, ScienceDirect, Directory of Online Journals, PubMed etc.) reports, books, online library (TIB Uni Hannover), and other extension facts sheet from Universities websites online.
- □ In this review dehydration and drying are used interchangeably (Rahman and Perera, 2007).

3. Results

- \Box Freeze drying also decreased the total carotene and β carotene content in blanched (18.60% & 18.91%) and unblanched (4.99% & 10.46%) as well as vitamin C in blanched (30.67%) and unblanched (13.21%) samples.
- □ Far infrared dried leaves also showed a decrease in total carotene and *B*-carotene content for blanched (24.86% & 29.3%) and unblanched (34.90% &37.94%) samples (Sopian et al., 2005). Cabinet drying (65 ± 5 oC) was found to be better than sun, shade and solar drying because it retained more beta-carotene and ascorbic acid (Negi and Roy, 2001).



Figure 1. Solar drying of Amaranth Leaves

4. Conclusion

Drying methods affect the nutrient retention of dried amaranth leaves Solar drying is recommended for drying amaranths; with the exception of reduced crude protein content, it had significantly (P < 0.05) higher nutrient (carbohydrate, fat, ash and fiber content), mineral (P, K, Ca, Mg and Na) and vitamin (A

Drying methods

□ The drying methods reported for amaranths include;

- Sun (Ukegbu and Okereke, 2013; Makobo *et al.*, 2010),
- Shade (Negi and Roy, 2000),
- Solar (Chege et al., 2014),
- Cabinet tray (Negi and Roy, 2001; Onayemi and Badifu, 1987), oven drying (Gupta et al, 2013; Kiremire et al. 2010)
- Freeze, infrared and vacuum (Sopian. *et al.*, 2005).
- Sun, solar and oven drying are the commonly used but the most practiced is sun drying (Kiremire et al., 2010).
- The attributes of sun (Rahman and Perera, 2007; Onayemi and Badifu, 1987), shade (Negi and Roy, 2000), solar, cabinet (tray), vacuum, freeze (Rahman and Perera, 2007) and far infrared (Sopian et al. 2005) drying methods are well expatiated in the citations provided.

and C) contents compared to the sun dried samples. Moreover solar drying could be more hygienic with reduced microbial load compared to sun drying.

5. References

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