

Nutritional quality of traditional African vegetables as affected by drying methods

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Abstract

Traditional African vegetables are inexpensive and high-quality nutrient sources in human diets. Availability of fresh vegetables is seasonal and preservation by drying is a means to extend availability but drying method can affect nutrient contents. Our objective was to assess the nutritive value of popular African leafy vegetables as affected by drying method. Two related studies were conducted at WorldVeg-Taiwan (Study I) and WorldVeg-Tanzania (Study II). The treatment design was a split plot with varieties and drying method as mainplot and subplot factors, respectively. Mainplots were arranged in a RCBD with three replications. Two varieties each of five leafy vegetables were grown in field trials at Taiwan and Tanzania. Vegetable yields were harvested and samples of 3-5 kg were subjected to different drying methods. In Study I, samples were assigned to freeze drying or oven drying. In Study II, samples were subjected to solar drying or direct sun drying. Protein, sugars, fiber, minerals, carotenoids, vitamin C, total phenolics and oxalates were measured. Results from freeze drying method were used as a standard. The five TAVs were high in protein, minerals, carotenoids and vitamin C although significant differences were detected among crops for various nutrients. Spider plant was notably high in beta-carotene. All crops contained oxalate with amaranth as the highest followed by cowpea leaves. Drying method significantly affected contents of most macro-and micro-nutrients. Freeze drying is considered as the best method to retain higher macro- and micronutrients and this was true in this study except for beta-carotene that was sensitive to longer drying even at low temperatures. Solar drying and direct sun drying allowed retention of the heat stable constituents (protein, fiber, sugars, minerals, oxalates) but caused a 100% loss of vitamin C, and 50-90% loss of carotenoids. The solar dryer used in this study did not improve nutritional quality versus direct sun drying in sunny weather.