Abstract

Effect of drying methods on the retention of bioactive compounds in African eggplant

African eggplants (*Solanum aethiopicum* L.) are a rich source of bioactive compounds and functional constituents that are beneficial to human health. However, the short shelf life of these vegetables can be a major cause of postharvest losses especially during peak harvesting season. Drying is one of the most convenient technologies for the production of shelf stable food products. However, drying can lead to considerable loss of the available bioactive compounds due to thermal degradation depending on the drying method and temperature conditions. This study investigated the effect of four drying methods (solar, oven, vacuum, and freeze) on the retention of total phenolics, beta-carotene, antioxidant capacity, and lycopene in five African eggplant (*S. aethiopicum*) accessions (sangawili, manyire green, S00047A, AB 2, and aubergine blanche). Samples were dried up to ~10% moisture content. The fresh and dried samples were analyzed for total phenolic content, antioxidant capacity, beta-carotene content, and the lycopene content. In the fresh state, beta-carotene, total phenolic content, and free radical scavenging activity ranged between 14.75 ± 0.50 and 29.50 ± 0.77 mg/100 g db, 751.21 ± 1.73 and 1,363.95 ± 2.56 mg/100 g GAE db, and 99.58 and 325.61 mg/ml db IC₅₀ value, respectively. The accession S00047 showed highest total phenolic content and lowest IC₅₀ value in the fresh samples. The results also showed that total phenolic content, antioxidant capacity, and beta-carotene contents were significantly (p < .05) affected by drying method and drying temperature with freeze-drying presenting the highest retention. Overall, 36.26%–95.05% (total phenolics) and 31.44%–99.27% (beta-carotene) were retained during freeze-drying. Lycopene was only detected in the dried samples of the accession manyire green but absent in all the fresh samples of all the accessions. This study demonstrates that freeze-drying was the most effective in retaining the highest bioactive compounds in African eggplants.