

**Reducing Postharvest Losses using Modified Atmosphere Packaging Bags on African
Nightshade (*Solanum scabrum* Mill.) leaves**

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Abstract: African nightshade (*Solanum scabrum* Mill.) is an important African indigenous leafy vegetable crop (ALV) for its nutrition, health, and economic importance in Kenya, contributing to secure food supply and livelihood of smallholder farmers in rural and urban/per-urban areas. Inadequate postharvest handling, facilities for storage and transport, insufficient hygiene conditions in the market, and poor infrastructure aggravate these problems causing high postharvest losses of the highly perishable ALV's comprising about 50%. To reduce postharvest losses and extend shelf life, studies were conducted to evaluate the effect of packaging material (i.e. Xtend® bags) on improving storability and nutritional as well as health promoting quality attributes of African nightshade plants cv. Olevolosi. Plants were cultivated in a climatic chamber for four weeks (20-25 °C) and three weeks under greenhouse conditions. Seven weeks after sowing, leaves were harvested and either packaged in modified atmosphere packaging bags (Xtend®) or left in the open (control). The African nightshade leaves were stored for 8 days (20 ± 2 °C and RH 60 ± 5%) and 14 days (7 ± 2 °C and RH 85 ± 5%). Weight loss, color (L*a*b*), antioxidative plant compounds (i.e. β-carotene, lutein, lycopene, chlorophylls), and protein content were evaluated at harvest and 2, 4, 8 and 14 days after storage. Gaseous content (CO₂ and O₂) within the packaging material was determined throughout the study. The results obtained showed that leaf color was retained by packaging, being more pronounced at 7 °C. Packaging of African nightshade leaves reduced weight loss, being 1.7% at 20 °C and 0.56% at 7 °C on day 8 and 14 of storage, respectively compared with the control (28-30%). Moreover, film packed leaves maintained or even increased contents of antioxidants such as β-carotene, lutein, lycopene, chlorophylls at 7 °C for 8 days of storage, whereas at 20 °C carotenoids and protein increased within 2 days, but thereafter declined in comparison to the control. Concentration of CO₂ increased to 4.7%, while O₂ was reduced to 17%, an indication of a reduced respiration rate of leaves in film packaged material compared with ambient conditions. The findings provide potential of using Xtend® packaging materials to improve shelf life and preserve bioactive quality compounds of African nightshade plants. This could be a vital step to improving nutritional, health and economic status of developing countries such as Kenya.

Keywords: African leafy vegetables, Packaging Film, Shelf-life, Bioactive Compounds