



Tropentag, September 20-22, 2017, Bonn

“Future Agriculture:  
Socio-ecological transitions and bio-cultural shifts”

## Effects of Age, Storage Temperature and Duration on Total Phenolics, Flavonoids and Antioxidants in African Nightshade

DINAH KIRIGIA<sup>1,2</sup>, HEIKO MIBUS-SCHOPPE<sup>2</sup>, TRAUD WINKELMANN<sup>3</sup>, REMMY KASILI<sup>4</sup>

<sup>1</sup>Leibniz Universität Hannover, Inst. of Horticultural Production Systems, Germany

<sup>2</sup>Geisenheim University, Dept. of Urban Horticulture and Ornamental Plant Research, Germany

<sup>3</sup>Leibniz Universität Hannover, Woody Plant and Propagation Physiology, Germany

<sup>4</sup>Jomo Kenyatta University of Agriculture and Technology, Institute of Biotechnology Research, Kenya

### Abstract

African nightshade (*Solanum scabrum*), a leafy vegetable plays a great role in food security and livelihood in sub-Saharan Africa. The vegetable is highly nutritious and contains phenolics and flavonoids, major sources of antioxidants highly valuable in human diet. The phenolics and flavonoids have other important properties such as, anti-inflammatory, antimicrobial, anti-allergenic and anti-thrombotic. The study aimed at analysing the secondary metabolites during development, storage at 5°C and 80–85 % relative humidity (RH) and room temperature (RT) (20–25°C) at 55–60 % RH, for a duration of 0, 2, 4, 6 and 8 days. The total phenolic contents (TPC) were analysed using Folin-Ciocalteu method and were expressed as Gallic acid equivalents. The calorimetric method was done for flavonoids followed by spectrophotometric absorbance at 510 nm and 415 nm, the results were expressed as catechin and quercetin equivalents. TEAC assays were conducted for antioxidants. The TPC, flavonoids and antioxidants were higher at 90 days after planting (dap) ( $12.6 \pm 1.7 \mu\text{g mg}^{-1}$ ,  $24.1 \pm 2.8 \mu\text{g mg}^{-1}$  and  $0.45 \mu\text{g mg}^{-1}$  of dry weight respectively). There was a significant decline of these three after 4, 6 and 8 days storage at RT. After 8 days of storage at RT, the TPC and flavonoids declined to  $1.1 \pm 0.1 \mu\text{g mg}^{-1}$  and  $2.9 \pm 0.9 \mu\text{g mg}^{-1}$  respectively. There was no significant decline at 5°C storage up to 8 days. Plant age, storage duration and temperature affects TPC and flavonoids and it would be recommendable to store nightshade at low temperatures to avoid losses. Further experiments are going on to determine development stages with optimal secondary metabolites and storage longevity.

**Keywords:** African nightshade, days after planting, flavonoids, phenolics, temperature