**Tropentag, September 17-19, 2018, Ghent**

"Global food security and food safety:
The role of universities"

# Salinity Tolerance of Guava (*Psidium guajava* L.) and the Implications for its Adaptation into Saline Environments

Josiah Chiveu, Elke Pawelzik, Marcel Naumann

*University of Goettingen, Department of Crop Science, Division of Quality of Plant Products, Germany*

**Abstract**

Water scarcity and salinity increasingly aggravate agricultural production. Natural boundaries imposed by soil salinity also limit the caloric and nutritional potential of agricultural production. Therefore, it is important to determine the salt-tolerance threshold of crops and to identify well-adapted genotypes. Common guava (*Psidium guajava* L.) is highly valued for its delicious fruits, which are an excellent source of vitamins, minerals, and natural antioxidants. However, guava production is faced with salinity challenges in many guava-producing countries, such as Brazil, Mexico, Australia, India, Sudan, and Kenya. In a six-week greenhouse experiment, guava plants were subjected to salinity levels of 0 mM (control), 10 mM (low), 20 mM (medium), and 40 mM (high) of sodium chloride (NaCl) to test the level of salt tolerance. The leaf dry biomass decreased with increasing salinity by 7.8, 26, and 67 percent in the low-, medium-, and high-salinity levels, respectively, while the same remained constant in the stems and roots. Consequently, the shoot/root ratio decreased with increasing salinity, suggesting that the root was less sensitive to salt stress than the shoots. An analysis of the proline levels confirmed the effect of salt stress on the leaves as proline increased with higher salinity. In accordance, the sugar content (fructose and sucrose) of the leaves also raised with increasing salinity, ranging from 0.98 g/100 g in the control to 1.67 g/100 g in the 40 mM treatment. The net photosynthesis in the salt treatments decreased in comparison to the control. Guava was not efficient at excluding Na from the transpiration stream as high amounts of Na were accumulated in leaves with increasing salinity until at 40 mM NaCl, when the plants began to die. This suggests that guava can tolerate a salinity concentration of less than 40 mM which should be considered for selecting guava accessions for adaptation to saline environments.

**Keywords:** Adaptation, NaCl, proline, *Psidium guajava*, salinity tolerance, selection, sugars

**Contact Address:** Josiah Chiveu, University of Goettingen, Department of Crop Science, Division of Quality of Plant Products, Carl-Sprengel-Weg 1, 37075 Goettingen, Germany, e-mail: josiah.chiveu@agr.uni-goettingen.de