

Plant Science

August 07-09, 2017 | Rome, Italy

Oxalates assessment in the roots and shoots of taro (*Colocasia esculenta* (L.) Schott) submitted to drought conditions

Carla S S Gouveia¹, José F T Gananga¹, Vincent Lebot² and Miguel Â A Pinheiro de Carvalho¹¹University of Madeira, Portugal²CIRAD-BIOS, Vanuatu

Oxalate accumulation by taro plants (*Colocasia esculenta* (L.) Schott) affects negatively their nutritional quality, producing acidity, causing lips, mouth and throat swelling if consumed fresh. The acidity is caused by the calcium oxalate crystals (raphides) accumulation, which is used as a protection mechanism against foraging animals. The relationship between calcium absorption and oxalic acid synthesis is also important for the plant's ion balance and osmoregulation, with excess insoluble calcium salt removed by precipitation with oxalic acid. The oxalate synthesis is related to photorespiration, through glycolate-glyoxylate oxidation, increasing the plant's photosynthetic rate in control conditions. The difference of the photosynthetic rate can be indirectly implied by the chlorophyll content index (CCI). The protein nitrogen accumulation and the starch variation are also important traits to understand the taro's oxalate response to drought tolerance, and how it affects the corm quality. The purpose of this study was to assess the influence of oxalates in the nutritional quality of roots and shoots of taro plants submitted to drought stress. Seven accessions from Madeira, Canaries and SPC collections were grown in greenhouse conditions. Control and experimental lines were submitted to different watering regimes for drought stress tolerance. Roots and shoots were harvested and evaluated for CCI, oxalates, crude protein, starch content, starch water solubility (SWS) and starch swelling power (SWP), using EEC methods. For drought stress response, the oxalic acid showed positive correlation with calcium oxalate, CCI and protein contents. Starch, SWS and SWP content showed negative correlations. Madeiran and Canaries accessions had a better tolerance response to drought by: increasing protein and CCI; decreasing starch content and the amylose to amylopectin ratio, leading to SWS and SWP decrease; oxalates had a slightly decrease. SPC accessions had opposite responses for CCI and oxalate contents.

Biography

Carla S S Gouveia is an MSc in Applied Biochemistry and a PhD Student in Biological Sciences. One of the main objectives of her PhD research project is to increase the threshold information about the drought stress adaptability conditions of two extreme important worldwide crops: sweet potato (*Ipomoea batatas*) and taro (*Colocasia esculenta*), by the creation of a prediction model about their mechanisms of biomass allocation, adaptation and response to water stress. She also worked in the regional sweet potato flour production for the bakery industry, with the biochemical characterization and quality parameters. Since then, she has worked with several crops as a Researcher at the ISOPlexis Genebank of Madeira University, performing the nutritional and technological evaluation of agriculture and agri-food genetic resources, including the crops considered for her PhD project.

csgouveia@staff.uma.pt

Notes: