

SHORT-TERM SCIENTIFIC MISSION PROPOSAL

ACTION NUMBER: Cost-1204

STSM TITLE: TOMATO ROOTSTOCKS TO IMPROVE THE TOLERANCE AGAINST
ABIOTIC STRESSES

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START DATE: 20 June 2013 **END DATE:** 20 September 2013

Introduction - Rootstock can drastically affect fruit characteristics. There are many reports on changes in fruit quality resulting from grafting. As known, fruits are able to photosynthesize during only part of their development, prior to ripening, but their photosynthesizing organelles determine many of the quality attributes of ripe fruit. In tomato fruits sugars, pigments and secondary metabolites needed for ripe fruit flavor and nutritional qualities depend on photosynthesis and chloroplasts in green fruit. The aim of this study is to determine the effects of rootstocks and interplay between rootstock and scion on green fruit chlorophyll content. Therefore, the characteristics of selected rootstocks should be determined firstly.

Chlorophyll synthesis and photosynthetic apparatus assembly require exposure to light and genetically defined developmental cues. Photosynthesizing chloroplasts develop in response to light, mediated by photomorphogenic signaling pathways. The sustained capacity of particular cells and tissues to form chloroplasts is strongly influenced by *Golden 2-like* and *Golden 1-like* so called *GLK2* and *GLK1*; transcription factors. In this proposal I would like to join with the proposal to determine the effectiveness of the *GLK2* and *GLK1* (*Golden 1-like* and *Golden 2-like*) genes in rootstocks which could be found in dark green tomato fruit, using Semi-Quantitative PCR technique. Additionally, chlorophyll contents, TSS, sugar ingredient as well as lycopene profiles of the fruits will be analyzed as a common method. Results will show us to work on further experiments as grafting and genes expression of chlorophyll in fruit.

Materials and Methods

As rootstock materials, different 16 accession lines and 36 heirloom tomato genotypes will be used. Tomato fruits will be labeled 3-4 days after anthesis (dpa), when they reach 0.5 cm diameter. Therefore all analyzes will be realized on the same age immature green fruits (10-25 dpa). The rootstocks will be grown in climate controlled greenhouse conditions. Based on abundance of *GLK1* and *GLK2* primes (Table 1), plants will be selected for further studies. Furthermore, chlorophyll, soluble solid contents (TSS), sugar and lycopene profiles will be analyzed in fruits.

Table 1. Sequences of tomato *GLK1* and *GLK2* primers.

Sequences	Forward Primer	Reverse Primer
<i>SI₁GLK1</i>	ATGGAAAGTTTCGCGATAGGAGGA	CTATGCACAAGTTGGTGGTATTTTA
<i>SI₁GLK2</i>	ATTTTCTCTCTTTTGATGTCACC	CYTTGATAATGTGGATGCCAAAA