**PhD: Food science**

**Title:** Production of tomato genotypes with higher content of carotenoids in the fruit

**Proposing supervisor:** Dott. Alessandro Nicolia (AGR/07) - CREA – Research centre for vegetable and ornamental crops.

**Co-supervisor**: Prof. Maria Manuela Rigano (BIO/04) Università di Napoli Federico II

**Objectives of the research project and interdisciplinary collaborations** (max 1000 characters):

In this project, novel genotypes with improved nutritional characteristics will be developed and characterized. Several genotypes that could have an augmented concentration of carotenoids will be used. In details, the mutants D27, CCD7, CCD8 and MAX1, involved in the strigolactones biosynthesis will be used. Additionally, also the mutants for the HY5 and PIF, involved in the shade avoidance response will be included. A characterization of fruit quality will be carried out according to the following parameters: colour, ripening, shelf-life, brix degree, carotenoid content, ABA content, VOC analysis and total antioxidant activity. The different genotypes will be also processed by using different methods to select the most suitable according to quality parameters. The materials will also be tested for abiotic stress resistances. Collaborations with Prof. Barone (AGR/07) and Prof. D'Agostino (BIO/11) will be carried out.

**Innovation and originality of the project in relation to the state of the art** (max 1000 characters):

It has been reported that in plants shade-avoidance determines a significant change in carotenoid content and an auxin-mediated hormonal response called phototropism (es. reduction in branching). On the other hand, strigolactones are carotenoid derived hormones, involved in the branching regulation by adjusting auxin sensitivity of the axillary buds. This PhD projects aim at understanding, by the use of the above mentioned mutants, the role that such tropism regulatory mechanisms have on fruit quality in tomato and abiotic stress resistance, that have not been considered so far.
This project will also include the development of processing methods that do not have any impact on the quality and on the content of carotenoids of the final products.

**Grant availability** (funds to support the research activities):

* Program BIOTECH, project CISGET (MIPAAF-CREA) focused on the development and analysis of mutant for the genes involved in strigolactones biosynthesis and production of antioxidants.
* Privat agreement with seed company ISI Sementi (Fidenza) for the development of novel tomato lines.
* Project PRIMA 2020 “Use of Tomato lines tolerant to Proximity shade to Increase yield and Quality in intercropping agrosystems” UTOPIQ. Programma: PRIMA Section 2 Call multi-topics 2020.

**Collaborations with foreign institutions** (max 500 characters):

Prof. Antonio Granell Richart, Research professor at Consejo Superior de Investigaciones Científicas CSIC (Spain)

Prof. Kaori Yoneyama Professor at Ehime University (Japan)

Prof. Harro Bouwmeester Professor at University of Amsterdam (The Netherlands)