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EVALUATION OF DIVERSITY FOR METABOLIC COMPOSITION IN A COLLECTION OF TOMATO (SOLANUM LYCOPERSICUM L.) SARDINIAN LANDRACES

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Genetic resources have a key role in the resilience and sustainability of agriculture and must be preserved to maintain the overall genetic variability present in a species. The loss of these materials, and a consequent decrease of crop genetic diversity, increases the vulnerability of future food productions and food supply with possible related food security issues. Fundamental for revealing the differences between local varieties and cultivars and to assess their inherent diversity, is their characterization, which includes morpho-phenological, molecular, chemical and organoleptic strategies. In fact, chemical compounds such as pigments, fatty acids, amino acids, flavonoids and volatiles determine the quality of a fruit. All these compounds involved in different physiological and biochemical processes, are highly variable in traditional germplasm. As a consequence, their study represents an effective method for the identification of genetic resources that can be exploited in breeding programs for the production of new commercial cultivars with target traits.

Accordingly, in the present study, developed in the context of a PON project (Programma Operativo Nazionale) which promotes the collaboration between local companies and University, a collection of tomato Sardinian landraces has been characterized and evaluated in comparison to vintage and modern varieties with the aim to assess the diversity of the collection for quality traits. Twelve Sardinian landraces and three modern varieties were grown during an autumn-winter season in a greenhouse of the partner farm located in Oristano (Sardinia, Italy). An in-depth characterization of these varieties through investigation of some chemical and organoleptic proprieties was obtained, focusing on the detection of primary metabolites and on selected secondary metabolites (carotenoids) at two ripening stages of the fruit (breaker and ripe stage).

The results show a wide range of variation in the content of primary and secondary metabolites in both breaker and ripe stage, and some accessions stood out for the content of specific metabolites. The metabolite analysis provided a powerful and reliable approach to study changes in the metabolite level of landraces. All together, these results evidenced the importance to maintain these genetic resources indicating that these materials may be used in crop improvement program.