

**METABOLOMIC CHARACTERIZATION OF PEPPER LANDRACES FROM PUGLIA REGION BY MEANS OF NON-TARGETED NMR SPECTROSCOPY AND MULTIVARIATE DATA ANALYSIS.**

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Pepper (*Capsicum annum* L.) fruits are an excellent source of beneficial compounds, being rich in fibers, vitamin C, vitamin E, carotenoids and flavonoids in general, responsible for their health-protective effects. This valuable crop is widely grown in the Mediterranean basin, especially in Italy, where soil and climate characteristics allow the cultivation of diversified landraces with distinct morpho-agronomical properties and quality-related features. Recently, several pepper local varieties from the Puglia region (South Italy), some of which at high risk of extinction, were collected. Ongoing studies are focused on phenotypic and genetic variability of these landraces, quality characteristics of their fruits and agronomic yields (BiodiverSO and BiodiverSO Karpos, PSR Puglia 2014-2020, Mis. 10.2 Projects). Plant metabolomics, combining high-throughput analytical chemistry and multivariate data analysis, represents a reliable and powerful tool to study the complexity of phytochemistry, since it allows to measure and compare simultaneously a pool of metabolites from crude natural extracts. With the aim to valorise local peppers for their peculiar nutritional quality, we used a non-targeted spectroscopic approach combining NMR experiments and multivariate data analysis to provide a comprehensive picture of the chemical composition of 10 pepper landraces from Puglia. The qualitative results of the metabolic profiling showed that local peppers are rich in hydrosoluble compounds such as sugars and organic

acids (i.e. malic and acetic acids), key factors in determining the taste characteristics. Essential amino acids, phenolic compounds and ascorbic acid were also identified, contributing to the nutritional value. This study provides valuable information on the biodiversity of the pepper landraces from Puglia region, correlated to factors of quality, nutritional value, and health benefits. The chemical phenotype description may help to promote them for both human consumption and breeding purposes.