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GEOCHEMICAL AND ISOTOPIC ANALYSIS FOR THE DEFINITION OF TOMATO'S TERROIR IN PO RIVER DELTA ENVIRONMENT: THE CASE STUDY OF MASSENZATICA (FE, ITALY)

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Food traceability is one of the available tools to avoid food fraud and ensure its quality and safety and tomato is one such product that could be subjected to food fraud. It is an important commodity in the Italian market and can be processed for many products. The traceability of tomatoes is important especially in Italy, where the product's geographical origin is considered an indication of quality. Terroir is a widely used term in oenology but can usefully be applied to other food products in relation to geographical and environmental determinants of composition. To define tomato's terroir in the context of the Po plain near the Adriatic Sea coast, geochemical and isotopic analyses were performed on samples of soil and tomato roots, leaves and berries from two areas in Massenzatica (C and NC, 2 km apart from each other, the latter being closer to the sea). The soils differed with respect to some major oxides and calcium carbonate content. Tomato roots had concentrations of some major elements (Fe, Na, Al) than other plant organs, and between the two sites, some notable differences could be highlighted. Tomato leaves were more abundant in Ca and Mg, again with differences between the two sites. The berry skin and pulp were rich in B compared to vegetative organs. The seed had a notable peak for Cu and Zn. The isotopic data of $\delta^{+}C$ showed consistent differences between NC and C samples for all parts of the plant, suggesting that the farming conditions were not exactly the same and affected the carbon assimilation. Therefore, it was concluded that the continuity in composition from soil to plant, up to the reproductive structures, can ground an innovative elementomic approach to tomato traceability with a high level of resolution. Particularly, the origin of the tomato can be effectively traced back to the cultivated site based on geochemical soil properties and selective element transport to and accumulation in the plant organs.