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TOMATO PEEL FRUIT VARIANTS AS A SOURCE OF ADDED-VALUE FOOD WASTE

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Tomato (*Solanum lycopersicum* L.) is one of the most cultivated vegetables in the world, with a worldwide production of over 189 million tons in 2021. The tomato fruit is consumed as fresh or processed product (e.g., tomato pomace) and the demand for processed tomatoes is expected to increase. Approximately eight million tons of tomato waste have estimated to be produced by the food industry, mainly consisting in peel residues representing an environmental issue as well as an industrial cost. Nonetheless, these waste materials have been demonstrated to represent a rich source of natural bioactive compounds, including antioxidants. Therefore, in recent years, several researchers focused on the valorization of tomato peel waste as an ingredient for developing value-added foods, especially as a source of carotenoids, being the most representative tomato antioxidant compounds. Breeding programs performed on tomato allowed the introgression into cultivated genetic backgrounds of wild alleles (i.e., *atv* and *Aft*) affecting anthocyanin biosynthesis regulation. Thus, a purple-skin tomato genotype, known as "Sun Black", with the external color determined by the anthocyanin accumulation in the peel was selected. In this work, three San Marzano (SM) genotypes including the wild type (WTEP), Sun Black (SBEP), and *colorless fruit epidermis* variant (CEP), displaying a transparent peel because of a mutation causing the lack of naringenin

chalcone, were processed by an in-house method simulating the industrial tomato pomace production. Peels obtained were dried in a static oven (50°C) to obtain a storable product. Dried peels were ground and analyzed for their nutritional composition, antioxidant activity, and flavonoid and anthocyanin profile. Commercial dried tomato powder (CTRP) was included as control. Results showed that, although the peel from the three SM genotypes had no differences nutritionally and in the total phenolic compounds content, significant differences were observable in the total antioxidant activity and in the flavonoid and anthocyanin profiles, underlying that the analyzed samples differed for the type of their phenolic compounds. Specifically, SBEP had the highest total flavonoid content and antioxidant activity. LC/MS analysis showed an enrichment of flavonoids and mostly anthocyanins in SBEP compared to WTEP and, especially, CEP. Petunidin, malvidin and delphinidin were the main anthocyanins identified in SBEP and undetectable in WTEP and CEP. Among flavonoids, kaempferol-rutinoside, naringenin and rutin were the most abundant in SBEP, being up to two-fold higher than in WTEP. These compounds exsert several biological activities including antioxidant, anti-inflammatory, cardioprotective and neuroprotective. Hence, our study demonstrated that dried tomato peel, especially that of the Sun Black genotype, represents an extremely valuable waste product to be transformed into functional ingredients, reducing the food industry waste.