P-023: Effect of postharvest handling on flavor-related quality attributes of tomato fruits

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Tomato is the most popular vegetable in Germany (BLE, 2015) and one of the most consumed horticultural crops in the world [1]. Tomatoes have a high nutritional value, as they are rich in vitamins and antioxidants [2]. In recent times, consumers have complained about the poor flavor of tomatoes [3,4]. Conventional breeding programs generally focus on yield, firmness, and long shelf life [3,4], which may have caused a decrease in flavor acceptance. Besides, postharvest handling affects the flavor of the tomato fruit [5]. The goal of the PETRA^{q+n} project (participatory development of quality tomatoes for sustainable regional production) is to create a scientific basis to breed tomato cultivars with improved quality and optimal adaption for sustainable regional and urban production. The flavor of a tomato is a complex interaction of taste and aroma [6]. Major contributors are sugars and acids [7]. Other important non-volatile contributors to the flavor include fatty acids and pigments [8]. Over 400 volatiles have been identified in tomatoes so far [9], but only around 16 - 20 contribute to the characteristic tomato flavor [9,10]. It has been shown that refrigeration changes the aroma volatile profile and has a negative effect on the flavor [11,12]. However, the time from harvest to retail is shorter than in earlier decades and it is important to evaluate the whole postharvest handling. The influence of the entire postharvest handling chain has not been considered yet. The studied crossbred offspring are combinations of parental cultivars with high yield and good quality parameters. They were grown in a low-input production system, and the entire transportation route of tomatoes from harvest to retail to the consumer was evaluated. Two methods of household storage were considered, storing at room temperature (20°C) and storing in a refrigerator (7°C). Important non-volatile compounds of tomato fruits were analyzed, comparing fresh fruits with fruits stored in two different temperature regimes, while the fruits were handled in the same manner beforehand and were harvested ripe. Earlier studies raised the issue that many laboratory studies are not comparative to commercial practices and thus it should be assumed that the handling steps at different levels are not isolated [13]. The aroma compounds of the fruits were collected using headspace solid phase microextraction (HS-SPME), identified by GC-MS and semi-quantified by GC-FID. We observed an increase in the content of total soluble solids (TSS) after postharvest handling in both storage regimes and only a slight decrease in titratable acidity (TA), while the storage temperature did not show any effect.

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