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**Development of strategies for the recovery
of valuable compounds from by-products
of apple juice production**

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Zusammenfassung:

Due to numerous epidemiological studies of the last decades revealing potential health benefits of a diet rich in fruit or vegetables and a growing consumer awareness of food-related health aspects there is increasing demand for plant based food-stuff. In the temperate zone fruits of the Rosaceae family, particularly apples are among the most important fruit crops being processed to a wide range of food products generally involving the removal of their seeds. Consequently, large amounts of this type of by-products are accumulated not being utilized further. Their disposal represents both additional costs to the food processing industries and a potential negative impact on the environment with the situation being further aggravated by legal restrictions. Nevertheless, by-products of plant food production are an attractive and rich source of functional compounds possessing favorable technological or nutritional properties. The targeted recovery of these compounds and their application as functional food ingredients or dietary supplements therefore may be an adequate strategy for valorizing waste streams, thus contributing to sustainable agricultural production. In order to realize economically feasible recovery strategies from these by-products most detailed information on technological or nutritional relevant substances is imperative. Therefore, the occurrence and amounts of different classes of valuable compounds as well as the potential recovery of natural pigments from seeds of apple and further Rosaceous fruits were systematically investigated and strategies for their complete utilization are provided.

The present study revealed the seed by-products to be promising sources both for the recovery of lipophilic and hydrophilic valuable compounds. The investigated Rosaceous seed oils were shown to be rich in unsaturated fatty acids with essential linoleic acid prevailing. Moreover, these oils were found to contain appreciable amounts of lipophilic antioxidants with potential health-promoting properties such as carotenoids and most of all tocopherols.

The residues of apple seed oil production were also demonstrated to serve as an interesting source for the recovery of structurally diverse phenolic compounds with low and high molecular weight (procyanidins). Since the fraction of low molecular weight phenolics is characterized by high proportions of phloridzin, differently constituted phenolic extracts derived from apple seeds may be further utilized for the

recovery of colored preparations. Such preparations obtained by enzymatic oxidation may be used as potential coloring food ingredients concurrently exerting antioxidant properties.