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Title: Improved processes for the conversion of mango peel into storable starting material for the recovery of functional co-products

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Abstract: Fresh industrial mango peel waste (MPW0) has to be processed into a storable commodity to enable its upgrading into dietary fibers or pectin and antioxidants regardless of its seasonal availability. In this feasibility study, 19 prototype processes that involved hot-air drying for stabilizing the juicy MPW0 of fully ripe fruit were evaluated regarding the efficiency of the drying step, the recyclable mass percentage of MPW0, and the functional quality of the dried mango peel (DMP). Depending on the process variant, hot-air drying was applied directly or after different types of peel preprocessing in order to assess the efforts needed for mechanical dewatering, the prevention of enzymatic browning by peel blanching, the control of the Maillard reaction by adjusting the drying temperature, and the removal of mesocarp from MPW0 by blanching or pressing. As shown by principal component analysis, the process variants, which proved to be most efficient regarding drying due to included peel blanching (88 degrees C, 1 min), pressing (150 bar, 5 min), and cutting, also ensured optimal performance of DMP. At best, the yields and purity of extractable pectins (11.4-13.2 ghg(-1) with 77-83% of galacturonic acid) as well as the dietary fiber contents, the antioxidant capacity, and the technological functionality were maximal. Especially the slurry viscosity of powdered DMP (15%, w/v; 16-31 Pa s at 2.5 s(-1)) and the water-holding capacity (6.5-7.1 g g(-1)) were decisively improved, but at the expense of slurry yellowness and a-carotene contents. Separation of puree (61 g hg(-1)) from MPW0 by intensive pressing before peel processing into DMP (8.7 g hg(-1)) yielded the maximal amount of reusable by-products without affecting DMP functionality. (C) 2014 Elsevier B.V. All rights reserved.

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