

Variety and Environmental Factors Affecting Pru p 7 Level in Peach Fruit: Implications for Hypoallergenic Variety Selection

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Abstract

Peach allergy is a global food safety concern. Pru p 7, a gibberellin-regulated protein, has recently been recognized as a clinically relevant peach allergen capable of eliciting severe systemic reactions. However, comprehensive quantitative data on Pru p 7 content across diverse peach germplasm remain limited. Using a highly sensitive sELISA, we elucidated the distribution profile, variation and the expression determinants of Pru p 7 across 123 core peach accessions. Pru p 7 content varied greatly ranged from 0.03 – 51.89 µg/g and differed depending on varieties. It was predominantly accumulated in the pulp, and its levels were significantly associated with fruit type, quality, flesh color, and ripening date. Common horticultural practices including fruit bagging and post-harvest storage were observed to reduce Pru p 7 accumulation. Peach fruit natural ripening promoted allergen accumulation, particularly during the S3 to S4 developmental stages. Among the cultivars examined, white-fleshed and late-ripening peaches (most with high sugar content and mild aroma) tended to contain relatively low levels of Pru p 7. Combining immunofluorescence localization, and western blot, we identified two hypoallergenic candidates with favorable fruit quality traits: 'Da Xue Tao' and 'Yumyeong'. These findings provide practical strategies for the peach industry to mitigate allergen risks through variety selection and cultivation management, and offer science-based dietary recommendations for peach-allergic individuals.

Keywords

Peach, Pru p 7, Hypoallergenic Varieties, Protein Quantification, Environmental Factors