Polygalacturonase gene *FaPG1* downregulation is related to increased strawberry fruit resistance to fungal decay

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Plant health is a major target in breading programs because crops are under constant biotic stress, and climate change is exacerbating pests and disease negative impacts in agriculture. Obtaining crop varieties armed with better defences is a potential strategy to reduce losses from biotic attacks. Plant cell walls perform crucial roles on many physiological processes, and under biotic stress, play crucial defensive roles as protecting barrier, as well as a source of integrity signalling molecules. Plant immunity has evolved a complex multi-layered system which first line of defence is initiated by conserved molecular patterns coming from pathogens, named pathogen-associated molecular patterns or PAMPs, or from their own corrupted cell walls due to pathogen invasion, named damaged-associated molecular patterns or DAMPs. Accumulating evidence from cell wall mutants has unveiled several components and mechanisms of plant innate immunity under biotic stresses, mostly in Arabidopsis, but still little is known from species with agronomic interest as strawberry. Our group has an established strawberry transgenic collection of cell wall mutants. Among them, RNAseq expression profiles of FaPG1 mutants has shown downregulation of other cell wall related genes than PG [1], but the mechanisms underneath required further investigation. *FaPG* genes code for enzymes with endo-PG activity related to oligogalacturonic acid (OGA) release, which would be associated to the changes in gene expression of other cell wall genes than *FaPG*. In this work, postharvest assays of FaPG1 fruits showed not only the increased fruit firmness typical of this mutant, but a better resistance to fungal infections by *Botrytis cinerea*, enhancing fruit shelf life in comparison with control fruits. The next step will be to determine whether the differential biotic resistance of this transgenic strawberry line is due to modified DAMPs and assess its potential use as strategic tools to enhance plant resistance in strawberry crops.

KEYWORDS: food security, plant innate immunity, resilience, pathogen resistance, damage-associated molecular patterns (DAMPs), *Botrytis cinerea*, oligogalacturonic acid (OGA), postharvest shelf life

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References

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