

# Effect of exogenous GA<sub>4+7</sub> and BA + CPPU treatments on fruit lignin and primary metabolites in Japanese pear “Gold Nijisseiki”

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## Abstract

The effects of exogenous GA<sub>4+7</sub> and BA + CPPU treatments at flowering on fruit traits, lignin, and metabolome were investigated in fruit of Japanese pear “Gold Nijisseiki”. Analysis of fruits in all treatments showed that both total and noncondensed lignin content increased early in fruit development and decreased toward harvest and that the core had higher lignin content than the flesh. The core of BA + CPPU-treated fruit had higher maximum total lignin content than did GA<sub>4+7</sub>-treated and control fruit at early fruit development. At harvest, the total lignin and noncondensed lignin content of BA + CPPU-treated fruit was higher than that of GA<sub>4+7</sub>-treated and control fruit. The lignin was composed of guaiacyl-syringyl types and the syringyl/guaiacyl (S/G) ratio increased during early stages and remained relatively stable toward harvest. These results suggest that exogenous GA<sub>4+7</sub> and BA + CPPU treatment affected only the lignin content, not the S/G ratio. In total, 122 substances were used for metabolome analysis. Partial least squares discriminant analysis first divided substances into clusters corresponding to core and flesh and then separated the clusters of substances associated with GA<sub>4+7</sub> treatment from those associated with the BA + CPPU treatment and control. Of these 122 metabolites, 40 were subjected to hierarchical cluster analysis. Among these, 8 metabolites were more abundant in the pear fruit core. The remaining 32 metabolites were more abundant in flesh and differed in abundance among treatments. The functional metabolite arbutin was more abundant in core than in flesh. In contrast, beta-nicotinamide ribotide was more abundant in flesh than in core.