

**Title** Mature fruit abscission is associated with up-regulation of polyamine metabolism in the oliveabscission zone

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### **Abstract**

This study investigates whether, and how, polyamines (PAs) are involved in mature fruit abscission of olive (*Olea europaea* L.). Physiological abscission was studied in relation to the activation of the abscission zone (AZ), located between fruit and peduncle, from two olive cultivars where the breakstrength profiles and the scanning electron micrographs illustrated differences in the abscission program, under natural conditions, of mature fruit. The localization and activities of diamine oxidase (DAO), polyamine oxidase (PAO) and PA biosynthetic enzymes, together with PA content were investigated in the fruit AZ during development and abscission. The activities of arginine decarboxylase and S-adenosyl-L-methionine decarboxylase in the fruit AZ were significantly increased and decreased, respectively, by mature fruit abscission, in good agreement with the rise in free putrescine (Put), and content in uncommon PAs there, such as homospermidine and cadaverine, while no significant differences in free spermidine (Spd) and spermine (Spm) contents were detected. By contrast, an abscission-induced decrease was noted in the contents of insoluble conjugated Put, Spd and Spm. The maximum activity of PAO coincided with the maximum content of Spd and Spm, and it was localized mainly in parenchyma cells of pith, while DAO was present mainly in parenchyma cells of pith and cortex as well as at the base of the vascular tissue. These results suggest a clear correlation between the PA distribution and mature fruit abscission. The regulation of PA metabolism is discussed in relation to mature fruit abscission.