

**Title** A new technique to prevent the main post harvest diseases in berries during storage: Inclusion complexes  $\beta$ -cyclodextrin-hexanal

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### Abstract

Natural occurring volatiles such as hexanal have a well know antifungal capacity but limited post harvest use due to their volatility. Taking this into consideration, hexanal was inserted into  $\beta$ -cyclodextrins ( $\beta$ -CD) to develop a controlled release mechanism and then evaluated *in vitro* against *Colletotrichum acutatum*, *Alternaria alternata* and *Botrytis cinerea*, the three main causes of post harvest diseases in berries. Different concentrations of both pure volatile hexanal and its inclusion complexes (IC) were analyzed for their fungistatic and fungicidal effects for 7 days at 23 °C. Hexanal has fungistatic effect on all fungi tested, however, fungicidal activity was only observed on *C. acutatum*. Results showed that hexanal's effectiveness was greater against *C. acutatum* than *A. alternata* and *B. cinerea*. Concentrations of 1.1, 2.3 and 1.3  $\mu$ L hexanal/L air respectively were necessary to prevent *C. acutatum*, *A. alternata* and *B. cinerea* growth. Lower concentrations reduced fungal growth depending on the included amount and type of fungus. Same amount of hexanal released from  $\beta$ -cyclodextrin had a lower antifungal effect on *C. acutatum*. Thus, ICs  $\beta$ -cyclodextrin-hexanal can be used to reduce or avoid post harvest berry diseases because of their capacity to provide an antifungal volatile during storage, distribution, and consumer purchasing.