Exogenous phytosulfokine α application delays senescence and promotes antioxidant nutrient accumulation in strawberry fruit during cold storage by triggering endogenous phytosulfokine α signaling

Morteza Soleimani Aghdam, Mohammad Sayyari and Zisheng Luo

Postharvest Biology and Technology, Volume 175, May 2021, 111473

Abstract

In this study, the mechanism by which the exogenous application of 150 nM signaling bioactive peptide phytosulfokine α (PSKα) delays senescence and improves antioxidant nutrient accumulation in strawberry fruit during storage at 4 °C for 18 d was investigated. Results showed that the higher endogenous accumulation of PSKα in strawberry fruit treated with 150 nM PSKα may result from the higher expression of *PSK3* and *PSK6* genes. Besides, the higher endogenous accumulation of Ca^{2+} in strawberry fruit treated with 150 nM PSKα may be ascribed to the higher cytosolic accumulation of cGMP, resulting from the triggering of endogenous PSKα signaling pathway, represented by higher expression of *PSKR1* gene. Besides, the higher endogenous melatonin accumulation resulting from higher expression of *TDC*, *T5H*, *SNAT,* and *ASMT* genes in strawberry fruit treated with 150 nM PSKα may be ascribed to the higher endogenous accumulation of Ca^{2+}. Moreover, the higher ABTS and DPPH scavenging capacity in strawberry fruit treated with 150 nM PSKα may be ascribed to the higher accumulation of phenols, flavonoids, and anthocyanins, resulting from higher gene expression and activities of *PAL* and *CHS*. Based on our findings, the exogenous application of PSKα could be employed as a beneficial procedure for delaying senescence and improving antioxidant nutrient accumulation in strawberry fruit during cold storage, by triggering endogenous PSKα signaling, promoting endogenous melatonin accumulation, and activating the phenylpropanoid pathway.