Title Possibilities of practical use of jasmonates in production of fruits and vegetables

Author M. saniewski, M. Horbowicz and S. Kanlayanarat

Citation Book of Abstracts, Southeast Asia Symposium Quality and Safety of Fresh and Fresh Cut Produce Greater Mekong Subregion Conference on Postharvest Quality Management in Chains, August 3-5, 2009, Radisson Hotel, Bangkok, Thailand.

Keyword jasmonic acid; methyl jasmonate; biological activities

Abstract

Jasmonic acid (JA), methyl jasmonate (JA-Me) and their related compound, designated as jasmonates, are widely distributed in the plant kingdom and show various important biological activities in the regulation of plant growth and development. Jasmonates, mostly JA-Me, are important signal transducers and greatly stimulate the biosynthesis of a wide range of secondary metabolities in plant cell cultures and in different intact plants.

In herewith review we focused on the role of jasmonates in regulation of some physiological processes in growth and development of fruits and vegetables. For example, preharvest application of methyl jasmonate improved fruits quality of blackberry (Rubus sp.) and strawberry by simulation of flavonoids and anthocyanins biosynthesis, and increase antioxidant capacities. In case of sweet basil JA-Me enhanced accumulation of alkaloids, terpenoids and phenolics. Moreover, methyl jasmonate has been demonstrated to increase anthocyanin content in apple and strawberry fruits. It is well known that flavonoids, mostly anthocyanins, show preventive and therapeutic activities in many illness, for example extracts of blackberry fruits showed anticancer activity against human lung cells and leukemia cells.

Besides, it has been found that exogenous methyl jasmonate inhibits lycopene in tomatoes and stimulates ß-carotene accumulation in tomatoes, apples, banana, guava, mango, and greatly stimulates ethylene production in tomatoes at different stages of ripening, as well as in preclimacteric apples, Japanese plum, and mangoes.

Methyl jasmonate appears effective in reducing chilling injury in avocadoes, grapefruits, mangoes, peppers, cucumber and other. JA-Me inhibits postharvest sprouting and improves storage quality of radishes. It is interesting also that methyl jasmonate extends shelf and reduces microbial contamination of fresh-cut celery, peppers, pineapple and tomatoes.

The endogenous level of jasmonates during development and storage of various fruits and vegetables and the effect of exogenous JA-Me on physiological process during fruits maturation will be presented as well. Cooperative cross-talk among jasmonates and other phytohormones, especially ethylene occurs in regulation of growth and development and in defense responses against a wide of abiotic and biotic stressors.

Moreover, it should be mentioned that jasmonates have a medical importance due to inducing suppression of proliferation and death in several human cancer cells (leukemia, prostate, breast, lung and melanoma cell lines). These recently published findings suggest that the natural product jasmonates may potentially be a novel class of anticancer drugs.