

Title Biological activity of gums induced in tulip (*Tulipa gesneriana* L.) by *Fusarium oxysporum* f. sp. *tulipae*, ethylene and jasmonates

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Abstract

Gums are induced by fungal and bacterial infection, insect attack, mechanical and chemical injury, heavy metals, water stress and other environmental stress factors. All of these biotic and abiotic stress factors are believed to act *via* ethylene produced in plant tissues. The formation of gums in tulip bulbs is induced by *Fusarium oxysporum* f. sp. *tulipae* producing considerably high amounts of ethylene and by exogenously applied ethylene or ethylene-releasing compound, ethephon. Exogenously applied jasmonates, mainly methyl jasmonate, have also been shown to have a promoting effect of the induction and/or production of gums in tulip bulbs, stem, basal part of leaves and pistils. Endogenous jasmonates rapidly increase in plant tissues in response to infection of pathogens, insect attack, mechanical damage, and other abiotic stressors. It is suggested that the induction and production of gums are regulated by a signal network of jasmonates and ethylene, especially by cross-signals between them. It is believed that gums have a function in limiting the spread of pathogens and insects by isolating the infected tissues. Gums are the complex of different substances, but their most important constituent are polysaccharides of highly individual structure. It was shown that addition of tulip gums at a low concentration to PDA, CzDA and MEA media greatly stimulated mycelium growth of *Fusarium oxysporum* f. sp. *tulipae* and sporulation of the pathogen. Thus, it can be suggested that polysaccharide of tulip gum which is glucuronoarabinoxylan may act mainly as an elicitor which regulates some processes connected or responsible for mycelium growth and sporulation of *Fusarium oxysporum* f. sp. *tulipae*. Supplementation of liquid Czapek-Dox-Broth medium (CzDB), both containing sucrose and the mineral medium (m-CzDB) with tulip gum, increased secretion by the pathogen of some enzymes connected with degradation of tulip gum polysaccharides. Tulip gum elicited red coloured secondary metabolite(s) in the mycelium of *Fusarium oxysporum* f. sp. *tulipae*. The polysaccharide of tulip gum may act as an elicitor responsible for the formation of the red compound by hyphae of *Fusarium oxysporum* f. sp. *tulipae*. The effect of tulip

gum on the ethylene production in *Fusarium oxysporum* f. sp. *tulipae* and on some other physiological processes will be presented.