

Effect of anthocyanins on the production of mycotoxins by *Fusarium* spp.

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Anthocyanins are secondary metabolites produced by plants, that play different physiological roles (mainly related to their antioxidant and antimicrobial properties). Their antimicrobial activity has been reported against bacteria and rarely against fungi, never against toxigenic *Fusarium* species infecting wheat. Aim of the present work was to study if and how anthocyanins and their respective aglycon forms (anthocyanidins) can have an effect on *Fusarium* spp. Growth and on mycotoxins production, using *Fusarium avenaceum* as model. Pure anthocyanidins (cyanidin and delphinidin) and anthocyanins (delphinidin-3-glucoside and cyanidin-3-glucoside) were tested at different concentrations and using different culture media. Fungal biomass and mycotoxins production (after 14 days post inoculation) were assessed and the differential expression of key genes (ESYN and KIVR) related to enniatins production (after 4 days post inoculation) was analysed. The tested compounds, at a concentration of 0.2 mM, didn't show any effect on fungal growth and even led in some conditions to an increase. Cyanidin-3-glucoside and delphinidin were shown to induce a decrease in enniatins production. Concentrations in enniatins in 14-day-old cultures were up to 10 times less compared to the untreated control. Besides, delphinidin supplementation of the culture media resulted in a drastic reduction of the relative expression of the ESYN and KIVR genes. To go further, with the aim to mimic the composition of natural extracts from wheat brans, anthocyanins were tested in combination with ferulic acid. A dose-dependent effect was observed but no interaction between the effect of anthocyanins and of ferulic acid were evidenced. Additional researches are needed to better evaluate the role of this diversified category of compounds on plant-pathogen interaction and its potential use as antimicrobial agent, considering other plant pathogens and mycotoxin pathways.