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“Resilience of agricultural systems against crises”

## The Dark Side of Fungal Melanin: *Alternaria alternata* as Example

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### Abstract

Melanins are dark, brown to black, high molecular weight pigments produced by organisms ranging from animals and plants to micro-organisms. These pigments are formed by the oxidative polymerisation of phenolic or indolic compounds. Melanins appear to have an indirect as well as a direct function in virulence of microorganisms. Melanins accumulate in fungal cell walls and act as body armour protecting fungi against environmental stress or unfavourable conditions like extreme temperatures, drought, UV, ionizing and gamma radiations, compounds secreted by microbial antagonists, and defense responses of host plants and animals against fungal infection. The potential protection role of melanins produced in fungal cell walls against radiations was investigated in this study through the assessment of the inhibitory effect of UV-radiation on the growth rate of *Alternaria alternata* as a melanized fungus and *Fusarium oxysporum* and *Penicillium digitatum* as non-melanized fungi. Spore suspensions of these fungi were exposed to different wavelengths of UV-radiation (300 nm & 600 nm). The growth rates of these fungi were measured after 3, 6 and 9 days of incubation. The results showed that the inhibitory effect of UV-radiation against the nonmelanized fungi; *F. oxysporum* and *P. digitatum* was significant when compared to the melanized fungus *A. alternata* which tolerated the radiation with growth rates of 0.07 mm h<sup>-1</sup>, 0.06 mm h<sup>-1</sup> and 0.23 mm h<sup>-1</sup>, respectively when exposed to the wavelength 600 nm of UV-radiation. When putting in consideration the wide application of the classical methods for sterilisation as well as by UV-radiation, the gloomy picture of protection becomes clear as melanin is produced by some wide spread fungi.

**Keywords:** *Alternaria alternata*, melanin, UV-radiation, wavelength