Title: Characteristics of extracellular polymers obtained from the culture of selected Ascomycota fungi

Microbial exopolimers (EPS) play an important role in protecting against stress factors and in shaping interactions with other organisms. As biologically active compounds, they are of interest in many fields of science and industry, including medicine and agriculture. The EPS produced in high concentrations by bacteria and fungi belonging to the Basidiomycota type have been thoroughly understood. Ascomycota-type EPS, on the other hand, has so far been very poorly studied although it appears to play a key ecological role and have great potential as biologically active compounds. Understanding this role and potential of EPS produced by different genera and species of Ascomycota requires choosing methods of sourcing and determining the composition and properties.

This work characterizes the EPS obtained from the culture of ten different species of *Ascomycota* belonging to the three most common types in the environment: *Fusarium* spp. - *F. culmorum* (3 strains with different impacts on the plant), *F. avenaceum, F. oxysporum, F. graminearum*, *Trichoderma* spp. - *T. koningiopsis, T. harzianum, T. reesei* i *Penicillium* spp. - *P. simplicissimum, P. paneum, P. commune*. EPS was obtained in the cultures of all tested strains, but the EPS concentration was low (from 0.02 to approximately 0.1%) depending on the strain, the period of culture and the composition of the medium. The EPS of each species differed in the content of proteins, phenolic compounds, total sugars and the composition of sugar monomers. The EPS of all the strains tested contained heteropolysaccharide mainly composed of glucose, mannose and galactose. The lowest sugar content was characterized by EPS of *F. culmorum* strains and the largest EPS of *F. oxysporum* and *P. commune*. Highest content (>90%) of glucose was found in EPS *F. avenaceum* and *F. graminearum* and mannose (approximately 60%) in EPS of two *F. culmorum* strains and in *P. paneum* and *P. commune* EPS. The obtaining EPS showed the ability to bind up to approximately 90% of heavy metals (Cd, Pb, Zn) from the solution. All tested Ascomycota fungi produced EPS in the presence of these heavy metals Ascomycot's EPS exhibited antioxidant activity but at up to 15% (*P. simplicissimum*). EPS introduced on wheat seeds resulted in a 3-5-fold increase in the activity of plant resistance induction specific enzymes in the tissues, characteristic for plant resistance, such as: phenylalanine and tyrosine lyase, ascorbate and guaiacol peroxidase, catalase, glucanase and chitinase, indicating elicitor potential of the of Ascomycot's EPS without affecting the seed germination and wheat seedling growth.

Key words: Extracellular Polymeric Substance (EPS); Ascomycota fungi: *Fusarium* spp., *Trichoderma* spp., *Penicillium* spp.; culture optimization; fractions and sugar composition of EPS; antioxidant, elicitor, metals complexing properties

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