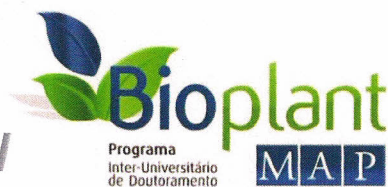


Programa
Inter-Universitário
de Doutoramento



**Programa Inter-Universitário de Doutoramento
em Biologia de Plantas Fundamental e Aplicada**

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Berry sugar content is directly related to the final alcoholic content of wine, and regulates the development of its aromatic and organoleptic properties. High temperatures affect berry set and development and alter the normal sugar content of the fruit. Also, peaks of high temperature, nowadays more and more frequent, may stop the ripening progress. We have been exploring the mechanisms involved in sugar import and compartmentation into the berry. VvHT1 (*Vitis vinifera* hexose transporter 1) is a high affinity plasma membrane H⁺-dependent symporter with broad specificity for monosaccharides abundant at early stages of berry development. The expression of this transporter is tightly regulated by sugars at transcriptional and post-translational levels (1). In the present study we aimed at the elucidation of the effect of extreme temperature and temperature fluctuations on sugar transport in grape cells. Results showed that a temperature treatment of 38°C for 12 h decreased by 40% the V_{max} of ¹⁴C-glucose transport in CSB (Cabernet Sauvignon Berry) cells. Contrarily, abscisic and salicylic acid stimulated sugar uptake. The down-regulation of glucose uptake mediated by high temperature corroborated the observed decrease of the VvHT1 levels in the plasma membrane. Additionally, proteomic analysis of the plasma membrane of CSB cells, allowed the identification of several proteins up-regulated in response to high temperature.

(1) Conde C, Agasse A, Glissant D, Tavares R, Gerós H e Delrot S (2006) Pathways of glucose regulation of monosaccharide transport in grape cells. *Plant Physiology* 141, 1563-1577

P22 Interaction between two co-occurring fungi present in chestnut orchards

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Hypholoma fasciculare is a wood-decaying basidiomycete with a worldwide distribution, including tropical, temperate and boreal forest ecosystems. In Trás-os-Montes region (Northeast of Portugal) this species is commonly present in soils of several habitats, including chestnut and oak tree forests. The ectomycorrhizal fungus *Pisolithus tinctorius* is another species with high occurrence in those ecosystems. The present work intends to study the *in vitro* interaction between *H. fasciculare* and *P. tinctorius* through evaluation of fungal growth, changes on hyphae morphology, the production of volatile compounds and lytic enzymes. The results obtained showed that *H. fasciculare* inhibited significantly the growth of *P. tinctorius* in 49%, long before hyphal contact of their colonies. This inhibition could be result from the liberation from *H. fasciculare* of volatile compounds and/or diffusible inhibitory substances, such as extracellular enzymes. Alteration in the production of volatile compounds, distributed in several chemical classes (alcohols, ketones, aldehydes, terpenes, among others) was detected over the time course of interaction. In addition, amylase, cellulase, laccase and lipase were produced by *H. fasciculare*. The possible role of these compounds during interaction will be discussed.

P23 Competitive interactions between ectomycorrhizal and saprotrophic fungi on chestnut tree

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In Northeast of Portugal the macrofungal community associated to chestnut tree (*Castanea sativa*) is rich and diversified. Among fungal species, the ectomycorrhizal *Pisolithus tinctorius* and the saprotroph *Hypholoma fasciculare* are common in this habitat. The aim of the present work was to assess the effect of the interaction between both fungi on growth, nutritional status and physiology of *C. sativa* seedlings. In pot experiments, *C. sativa* seedlings were inoculated with *P. tinctorius* and *H. fasciculare* individually or in combination. Inoculation with *P. tinctorius* stimulated the plant growth and resulted in increased foliar-N, -P, and photosynthetic pigment contents. These effects were suppressed when *H. fasciculare* was simultaneously applied with *P. tinctorius*. This result could be related to the inhibition of ectomycorrhizal fungus root colonization as a result of antagonism or to the competition for nutrient sources. If chestnut seedlings have been previously inoculated with *P. tinctorius*, the subsequent inoculation of *H. fasciculare* 30 days later did not affect root colonization and mycorrhization benefits were observed. This work confirms an antagonistic interaction between ectomycorrhizal and saprotrophic fungi with consequences on the ectomycorrhizal host physiology. Although *P. tinctorius* is effective in promoting growth of host trees by establishing mycorrhizae, in the presence of other fungi it may not always be able to interact with host roots due to an inability to compete with certain fungi.

P24 Cyanobacteria in the intertidal zones of the Portuguese coast

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Cyanobacteria are photosynthetic prokaryotes with a wide geographical distribution that are present in a broad spectrum of environmental conditions. Benthic cyanobacteria grow along the shore, mainly in the intertidal zone, forming cohesive mats. In these habitats, cyanobacteria are exposed to a range of daily stresses such as nutrient limitation, high UV-radiation, and desiccation [1]. Cyanobacteria play a major role in the global carbon cycle as important primary producers, and the diazotrophic taxa are fundamental to the nitrogen cycle, particularly in oceans [1]. They are also recognized as being a rich source of biologically active natural products. Some of these compounds are toxic to a wide array of organisms [2] and some are potentially useful in several fields, namely as pharmaceuticals [3]. Despite their important role, little is known about the diversity of these organisms along the Portuguese coast. To evaluate the diversity of cyanobacteria in the intertidal zones of the Portuguese coast, nine beaches were sampled, approximately 100 cyanobacterial isolates were retrieved and are being characterized by a polyphasic approach. Phylogenetic analyses were carried out and a screening for putative diazotrophs and toxins producers was also performed.

References:

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P25 Identification and analysis of cadmium transporting HMA genes in *Solanum lycopersicum*

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