

Transgenic *Physcomitrella patens* as biosensor of organic pollutants

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The measurement of stress proteins as an endpoint of toxicological research has become a useful alternative to study the toxicity of pollutants. To investigate the effect of organic pollutants and understand their mechanisms of action, we used transgenic *Physcomitrella patens* strains carrying the GUS reporter enzyme under the control of two stress-inducible promoters (*hsp*, *dehydrin*).

Sulphonated and aromatic compounds are often poorly biodegradable and little information is available about their toxicological effect on biological samples. Chlorophenols are generally used as pesticides and as a wood preservative. After screening, we identified trichlorophenol (TCP) as an inducer the *hsp17.3B* stress promoter (Saidi *et al.* 2005). We observed that increasing concentrations of TCPs as well as exposure times activated the *hsp* promoter in a dose-dependent manner. When dose responses were performed under mild heat-stress, high synergistic effects were observed indicating strong cross effect between abiotic stress and pollutants in this phyto-biosensor.

We have generated another strain in which a *P. patens dehydrin (DHN)* promoter controls the GUS reporter protein. The *DHN* promoter responded specifically to osmotic and salt stresses but not to the heat shock and we are testing the effect of pollutants.

We aim to develop a sensitive plant biosensors to shed light on physiology of plants exposed to chemical pollutants in combination with abiotic stresses as in nature.

Saidi, Y., Finka, A., Chakhporanian, M., Zryd, J-P., Schaefer, D-G. and Goloubinoff, P., **Controlled expression of recombinant proteins in *Physcomitrella patens* by a conditional heat-shock promoter: a tool for plant research and biotechnology.** Plant Mol Biol, 2005. **59**(5): p. 697-711.