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Caroline Teyssier, Cécile Grondin, Ludovic Bonhomme, Michel Vallance, Domenico Morabito, Philippe Label, Marie-Anne Lelu-Walter

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IUFRO WORKING PARTY 2.09.02
SOMATIC EMBRYOGENESIS AND OTHER VEGETATIVE PROPAGATION TECHNOLOGIES

Session

Physiology, genetics, epigenetics, biotechnology, cryopreservation, etc.

Reduce water availability during hybrid larch somatic embryo maturation is not stressful

C. Teyssier[1], C. Grondin[1], L. Bonhomme[2], M. Vallance[1], D. Morabito[2], P. Label[1] & M.-A. Lelu-Walter[1]

[1]INRA, UR 588 Research Unit on Breeding, Genetic and Physiology of Forest Trees, 2163 Avenue de la Pomme de pin, CS 4001 Ardon, F-45075 Orleans Cedex 2, France, [2]University of Orléans, LBLGC, USC ARCHE, rue de Chartres, BP 6759, F45067 Orléans Cedex 2, France
caroline.teyssier@orleans.inra.fr

Development of clonal propagation method, such as somatic embryogenesis, has many applications including mass production of genetically improved plants. Since the 90's, INRA engaged researches on somatic embryogenesis of important species such as *Larix*, *Pinus sylvestris* and *P. pinaster* (Lelu-Walter *et al.* 2006; 2008; Lelu-Walter and Pâques, 2009). For these pine species, it is well established that somatic embryo maturation requires an increase of the gellan gum concentration of the culture media (Klimaszewska e*t al.* 2007). This high gellan gum is associated with reduced water availability from the culture medium to the embryonal masses (Klimaszewska *et al.*, 2000).

In hybrid larch, increase of gellan gum concentration (from 4 to 8gL^{-1}) improved both the quantity and the quality of cotyledonary somatic embryos that subsequently germinate and develop into plantlets (Lelu-Walter and Paques 2009). Indeed, on high gellan gum somatic embryos 8 weeks old had lower water content and higher dry weight compared with those matured on standard medium. This increase in dry weight is consistent with an increase in protein content (total and soluble parts).

To better understand this benefic effect of high gellan gum on hybrid larch somatic embryos maturation, a proteomic study was performed via 2D gels. The proteome of soluble proteins were compared after one week of maturation on both culture media. The 62 proteins with significant differences in abundance were identified by LC-MS/MS analysis. Their functional classes correspond to the "carbohydrate metabolism", "genetic information processing" or "information processing environment." Interestinlgy, physiological parameters and identified proteins suggested that somatic embryos were stressed when they were cultured on 4 gL^{-1} ie on standard medium.

In conclusion, this is the first report of a 2-DE proteomic analysis of conifer somatic embryo maturation in presence of gelling agent at high concentration. These results provides information related to conifer somatic embryo maturation at the protein level giving rise to a better understanding and control of the maturation process.

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