SPECIES-SPECIFIC VARIATIONS OF GLUTATHIONE AND MALONDIALDEHYDE BIOMARKERS MEASURED BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY-FLUORESCENCE

Sonia RAVERA[1], Juan Carlos SÁNCHEZ-HERNÁNDEZ[2]

[1]DiBT, Università degli Studi del Molise; [2]Universidad de Castilla-La Mancha, Campus de Toledo

Glutathione and malondialdehyde are common molecular biomarkers of oxidative stress in many animal and plant species. The variation between the reduced (GSH) and oxidized (GSSG) forms of glutathione or the total glutathione level is used as an index of exposure to environmental contaminants, whereas the increase of malondialdehyde (MDA) concentrations is a product of lipid peroxidation (cell membrane damage).
The aims of this study were (i) to compare the normal levels of GSH, GSSG and MDA in seven lichen species (*Evernia prunastri*, *Parmelia sulcata*, *Xanthoria parietina*, *Ramalina farinacea*, *Phaeophyscia orbicularis, Cladonia fimbriata*, *Physcia biziana* v. *biziana*) collected in an unpolluted area of Toledo (Spain) in April 2013 with the scope of using them for further environmental monitoring of contamination, and (ii) to implement an extraction/analytical procedure that involves a minimum amount of lichen thallus (<30 mg wet weight) without loss of sensitivity and specificity.
Concentrations of total glutathione varied from 242 nmol/g wet weight (wet wt) for *X. parietina* to 1208 nmol/g wet wt for *P. biziana*. In general, GSH concentrations were higher for all lichen species than the oxidized form. Malondialdehyde was detected as the thiobarbituric acid - malondialdehyde adduct by HPLC-fluorescence (Ex=515 nm, EM=553 nm) in all lichen species at concentrations that ranged between 16.3 nmol/g wet wt for *Ramalina farinacea* to 53.1 nmol/g wet wt for *P. biziana.* These preliminary data represent baseline levels of two common molecular markers of oxidative stress (glutathione and malondialdehyde) that may be included in the environmental monitoring for assessing physiological stress of lichens when used as bioindicators of air pollution. Furthermore, a simple, rapid and highly sensitive chromatographic technique was used, which involved a single homogenization procedure saving sample amount and time.