MOSSCLONE: A EU-FP7 project to standardize a devitalized moss clone as passive contaminant sensor

Native or transplanted mosses are largely used as biomonitors of air pollution, due to their efficiency in the load of a wide range of chemical compounds. Among others, the popular “moss bags” technique seems to show some limits mainly related to the environmental impact on collection sites and the lack of standardization of the exposure protocol.

BIOMONITORING by MOSS BAG TECHNIQUE

In order to overcome the limits of the traditional “moss bags” technique, the FP7 MOSSCLONE project, developed by an European research team, coordinated by University of Santiago de Compostela (Spain), proposes a new biotechnological tool mainly focused on:

- selection and culture of a particularly performing moss clone;
- molecular, physical, physical-chemical and multi-elemental characterization of the cultivated clone;
- large-scale production of new concept moss-bags for transplants;
- comparison between the data collected using moss-bags and traditional techniques (i.e. bulk deposition collectors, airborne particles samplers and gaseous pollutants samplers) to allow tool validation;
- methodological standardization to develop a protocol for using moss-bags;
- identification of pollution sources.

MOSSCLONE PROJECT: INNOVATION and AIMS

In the first 20 months of activity the Italian research team was involved in species selection for cloning, optimization of analytical procedures for molecular and chemical characterization of the moss clone, and in the exposure standardization assay.

In order to evaluate the influence of climate and land use on moss uptake, the first test exposure was performed in natural, urban, industrial and agricultural sites from three European regions: eastern Austria, Galicia, southern Italy, respectively with continental, oceanic and Mediterranean climate.

Moss exposure started on March 2013. All materials were exposed suspended on latticeworks for 3 months and then collected, dried at 40°C to constant weight and homogenized to a fine powder by a planetary ball mill with agate pockets, in order to exclude any contamination of trace metals. Measurement of metal concentrations is in progress at the TeLabs S.L. (Ireland).

For more information www.mossclone.eu

ACTIVITIES

- Green apices of Pseudoscleropodium purum (Hedw.) M. Fleisch. employed for exposure standardization assay
- Moss bags parameters
  - Shape (flat, ball, sphere)
  - Mesh size (1, 2, 4 mm)
  - Weight (15, 30, 45 mg/cm²)
  - Height (H1, H2, H3)
  - Exposure Time (3, 6, 12 weeks)

THE MOSSCLONE CONSORTIUM

- University of Santiago de Compostela (Spain)
- University of Freiburg (Germany)
- University of A Coruña (Spain)
- AMRA Scarl (Italy)
- TeLabs S.L. (Ireland)
- Orion S.R.L. (Italy)
- Biovia Environmental Consultant (Spain)
- TecnoAmbiente S.L. (Spain)
- Centre National de la Recherche Scientifique (France)
- Maderas Ornanda S.A. (Spain)