Genotoxic activities of aqueous extracts from *Pteridium aquilinum* croziers and young fronds and their relationships with their glycoside illudane metabolites

A. Cué[1], D. López[1], J. San Juan[1], M. Martín[1], L. Rodríguez[2], I. Feito[2], M. I. Sierra[3], J. Majada[4], H. Fernández[3], & L. M. Sierra[1,5,6] *

[1] Dpt. of Functional Biology (Genetics Area). University of Oviedo, C/ Julián Clavería s/n, 33006, Oviedo, Spain
[2] Programa Forestal. Servicio Regional de Investigación y Desarrollo Agroalimentario del Principado de Asturias (SERIDA), Finca Experimental La Mata, La Mata s/n, 33825 Grado, Spain
[3] Dpt. Biology of Organisms and Systems (Plant Fisiology Area). University of Oviedo, C/ Catedrático Rodrigo Uría s/n, 33071 Oviedo, Spain
[4] CETEMAS, Pumarabule, 33936 Siero, Spain
[5] Oncology University Institute of Asturias (IUOPA), University of Oviedo, Spain
[6] Institute of Sanitary Research of Principality of Asturias. Avda de Hospital Universitario s/n, 33011, Oviedo, Spain
* lmsierra@uniovi.es

The common fern *Pteridium aquilinun*, apart from being a biodiversity problem, because of its invasive properties, is also a health risk for animals and humans. Its consumption as food causes several diseases in animals, that can end up in death. In humans, its consumption, direct or indirectly, might be the origin of different types of digestive tumours. It is known for years that the carcinogenic components of Pteridium are the glycoside illudanes ptaquiloside, caudatoside and ptesculentoside, and their unstable dienone metabolites. Other more stable metabolites like the corresponding pterosines were described to be non-carcinogenic. After determining the *in vivo* genotoxic activities of aqueous extracts of Pteridium samples, collected in different parts of Asturias, in *Drosophila melanogaster*, we have studied their relationships with the respective metabolite content.

Samples were collected in several localizations in Asturias, at different altitudes, and along the National and Natural Parks. Aqueous extracts were obtained by vertical agitation for 2.5 hours of the lyophilized plant in milliQ water. The genotoxic activity was estimated with the eye SMART assay of *D. melanogaster*. Metabolite content was determined with ultra-high precision liquid chromatography linked with mass spectrometry (UHPLC-MS/M).

Results of genotoxic activity show clear differences among the different samples, with a negative correlation with the altitude. The metabolites detected in this analysis were the ptaquiloside and the three pterosines, B, A and G (from ptaquiloside, caudatoside and ptesculentoside, respectively). The genotoxicity data were analysed together with the different metabolite levels. Positive, statistically significant correlations were found with pterosine B and pterosine A levels. Since these metabolites were described as non-genotoxic, their contents could be acting as indicators of the levels of ptaquiloside and caudatoside, and of their corresponding dienones, that could not be measured. However, further information on pterosine genotoxicity is being gathered.

Funding: Ministerio de Ciencia e Innovación (Spain). Projects of Ecological and Digital Transition, Reference TED2021-131270B-I00.