



## Charlemont Grant Report

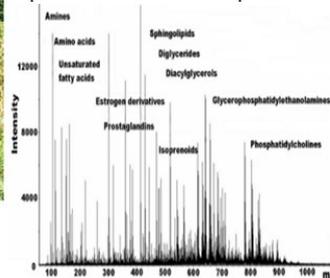
Recipient Name:	Dr Assistant Professor Konstantinos Gkrintzalis
Discipline:	Sciences
Amount and year awarded:	€2,000 in 2019
Title of Project:	Development of a multiparametric approach for the characterisation of phytochemicals of endemic plants and herbs

Analytical chemistry and biochemical expertise



... to the analysis of plant samples from collections

... guide us to the discovery of phytochemicals and active pharmaceutical compounds



Summary of findings:

During my research visit at the Université Paris Descartes, I was given the opportunity to perform research with analytical instrumentation that at the moment is not available in Dublin City University. Specifically, I had access to state-of-the-art mass spectrometers in the Faculté de Pharmacie de Paris, where I employed liquid chromatography coupled with mass spectrometry to analyse herbal extracts from several endemic Greek plants. Following, I analysed my data with the significant contribution of my collaborator Dr. Gregory Genta-Jouve, who has developed novel bioinformatics pipelines to predict and validate the metabolic content of the samples analysed. Dr. Genta-Jouve is a pioneer in natural product chemistry and metabolomics and this was a unique opportunity for me to work with him and get training on this pipelines. The metabolomics results I generated in his lab revealed the conclusive metabolic differences behind the plants analysed. Using multivariate statistics and network analysis we now have a clear picture of the plant samples analysed and additional biochemical work was carried out both while I was in Paris and following when I returned to Dublin City University. This breadth of results generated a methodology method which now stands as a new multiparametric protocol for plant extract analysis. This method is expected to target the plant chemistry audience and attract major attention as an approach for several researchers. We aim to submit this work for publication early in 2020. Furthermore, as there was sufficient instrumentation in place, since the Université Paris Descartes has several mass spectrometers available, I was given the opportunity to analyse an additional set of samples. These samples are irrelevant to the above work and this new set of results provided additional data to supplement another research article which will also be submitted in 2020.

Plans for continuing collaboration:

The most important aspect of this grant was the networking with good high skilled researchers and establishing a stable collaboration. I am very happy to report that Dublin City University now has a good connection with Université Paris Descartes. The generation of high impact results that can be published was the main task accomplished,



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	<p>which would not have been successful as in Dublin City University we lack the necessary instrumentation and expertise.</p> <p>Together with Dr. Genta-Jouve we will continue this collaboration and we aim to expand it in different fields. The applicability and the availability of instrumentation and expertise is quite valuable, and currently we have submitted a Ulysses collaboration grant to the Irish Research Council to use mass spectrometry analysis for a new project of a PhD student of mine that will allow us mobility and implement high resolution mass spectrometry. Additionally, since we had the chance to analyse additional environmental samples (that we aim to publish as well), we have found more angles to collaborate in the field of environmental metabolomics where I have successfully secured funding from Science Foundation Ireland. We have also applied for other research grants together as co-applicants and to ensure student mobility via future Erasmus calls we value that this will be a long and fruitful collaboration.</p>
Publication plans:	<p>During my research stay in Paris, with the analytical instrumentation available I was able to generate a significant amount of results that will add up to the publication of two research articles. Specifically, we have almost finished writing up a research article on the multiparametric method for plant extracts analysis, which we aim to submit to a prestigious journal, Nature Protocols, where I have previously published two more methods. This is quite an important output, as we will communicate our work to a wider audience. Furthermore, as already mentioned, with the additional availability of mass spectrometers, it was possible in the same time to analyse additional samples in another project of an environmental research. These samples, are currently under analysis and it is expected that they will add up to another publication in an environmental focused journal later in 2020.</p>
International dissemination:	<p>There is no planned participation for a conference at the moment, however, we look forward to the annual conference of Phytochemical Society, where depending on time availability this work could be communicated to a targeted audience.</p>
National dissemination:	<p>There is no planned participation for an Irish conference at the moment as it is with great regret that the Medicinal Product Chemistry Conference (which last year was hosted in Dublin City University) is not taking place this year. Some of the results of the environmental analysis (the second paper), will be presented in the 2020 SETAC conference in Dublin (an abstract has already been submitted from my current PhD student).</p>
Additional collaborations:	<p>During my research visit at the Université Paris Descartes I had the opportunity to visit the National History Museum of Paris and other Departments of the University and connect with researchers in my field with whom we aim to deliver more in terms of science in the future. Specifically, I networked with researchers in fields closely related to my work in toxicology and freshwater ecotoxicology. I am continuing this links with some follow up work in terms of identifying future research projects we could align our efforts to secure funding. As an example, I was given some liquid extract to analyse in my laboratory for their toxicities and we will assess the impact toward continuing this project here in Dublin City University. We have also submitted (November 2019) with Dr. Genta-Jouve and a colleague from Greece an application for a Grant4Traits in Crops to the company of Bayer.</p>
Outreach:	<p>Communicating research is an important aspect of academia. Dublin City University has several outreach activities in both our students and perspective students and society. During the orientation week of the fresher's, I had the chance to discuss with first year</p>



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	<p>students the research outputs generated highlighting the importance of travelling and communicating with other institutions in academia. Additionally, the Open Days of the University is a great opportunity where the university demonstrates its findings to prospective students. I find it fascinating to talk to young scholars interested in science in these occasions. Finally, as part of our Bachelor programs, in the School of Biotechnology, our fourth year students undertake research projects. I plan to put forward a research project based on the work that I performed in Paris and continue this research further.</p>
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