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Biotransformation of 5-caffeoylquinic acid by mono- and co-cultures of gut bacteria

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Polyphenols, naturally occurring, secondary plant metabolites, have drawn increasing attention from the scientific community due to their ability to lower oxidative stress involved in many pathologies and on their positive effects in modulation of redox cellular signalling pathways[1]. However, since they are characterized by a low bioavailability and given the crucial role of microbiota to generate bioavailable and bioactive metabolites[2], further insights are focused nowadays on their gut-derived metabolites as promising approach to prevent and attenuate neurodegenerative diseases[3].

5-Caffeoylquinic acid (5-CQA) known as chlorogenic acid, a dietary phenolic compound, has already shown neuroprotective properties[4] and some of its microbial gut-derived metabolites are already known[5]. We focus our work in the bioconversion of 5-CQA by intestinal bacterial species; *Bifidobacterium longum (Actinobacterium), Bacteroides fragilis (Bacteroidetes) and Lactobacillus reuteri (Firmicutes)* in mono and co-cultures. The extracts after incubation of bacteria with 5-CQA were analyzed by LC-MS/MS and particular attention has been be paid on oxidized compounds which could arise from redox pathways. In addition, an electrochemical strategy was adopted to generate oxidized compounds of chlorogenic acid in order to characterize and compare their mass profiles. A LC-MS/MS molecular networking through GNPS platform6 was also employed to identify the biotransformed metabolites.

In contrast to *B. fragilis and B. longum, L. reuteri* has shown capacity to biotransform 5-CQA into e.g. Caffeic acid (CA) and 3-Hydroxybenzoic acid (3-HBA). Nevertheless, preliminary experiments in co-cultures exhibited an interesting pattern in bioconversion of 5-CQA.

References:

1 Zhang H *et al.,* Curr. Opin. Food Sci. 2016; 8: 33–42.
2 Pasinetti G.M *et al.,* J Alzheimers Dis. 2018; 63: 409–421.
3 Carregosa D *et al.,* J. Agric. Food Chem. 2020; 68: 1790–1807.
4 Heitman E *et al.,* Nutritional Neuroscience. 2017; 20: 32–39.
5 Mortelé O *et al.,* J. Pharm. Biomed. Anal. 2019; 175: 112768.
6 Nothias L.F *et al.,* Nature Methods. 2020; 17: 905–908.

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Biography:

Gentiana Balaj has received a Pharmacy degree from University of Prishtina in 2016, and is currently a Ph.D. student at the University of Rennes 1 since 2019.

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