



HAL
open science

Comparison of the urine metabolomes of stratified SUVIMAX2 subjects to identify biomarkers of fruit and vegetable intake

Yoann Fillatre, Joe Rothwell, Mathilde Touvier, Bernard Lyan, Jean-Francois Martin, Charlotte Joly, Soizic Gueho, Léopold Fezeu Kamedjie, Nathalie Arnault, Jean-Louis J.-L. Sébédio, et al.

► To cite this version:

Yoann Fillatre, Joe Rothwell, Mathilde Touvier, Bernard Lyan, Jean-Francois Martin, et al.. Comparison of the urine metabolomes of stratified SUVIMAX2 subjects to identify biomarkers of fruit and vegetable intake. 9. Annual Conference of the Metabolomics Society, Jul 2013, Glasgow,, United Kingdom. 2013, 9th Annual Conference of the Metabolomics Society. hal-02744804

HAL Id: hal-02744804

<https://hal.inrae.fr/hal-02744804v1>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



P12-19

COMPARISON OF THE URINE METABOLOMES OF STRATIFIED SU.VI.MAX2 SUBJECTS TO IDENTIFY BIOMARKERS OF FRUIT AND VEGETABLE INTAKE

Yoann Fillâtre¹, Joe Rothwell¹, Mathilde Touvier², Bernard Lyan³, Jean-François Martin³, Charlotte Joly³, Soizic Gueho², Leopold Fezeu², Nathalie Arnault², Jean-Louis Sébédio¹, Blandine Comte¹, Serge Hercberg², Estelle Pujos-Guillot³, Pilar Galan², Claudine Manach¹

¹Human Nutrition Unit, UMR1019 INRA/University of Auvergne, Clermont-Ferrand, France, ²Research Unit on Nutritional Epidemiology, University Paris 13, INSERM U557, INRA U1125, CNAM, Bobigny, France, ³Plate-forme d'Exploration du Métabolisme, UMR1019 INRA/University of Auvergne, Clermont-Ferrand, France

The "Food metabolome" is the subset of all in vivo metabolites originating from the digestion of food components. Global analyses of these metabolites by high-resolution mass spectrometry, coupled with multivariate statistical methods, allow individuals with different dietary patterns to be distinguished. Further, the comparison of groups of low and high consumers of a given food can then be used as a basis for the identification of biomarkers of consumption. In a proof-of-concept study on citrus, we showed that urine profiling of cohort subjects stratified by consumption could be a more effective strategy for discovery of sensitive biomarkers of intake than intervention studies. As part of the ANR PhenoMeNEp project, we further tested this approach for the intake of 20 selected plant foods. Using dietary questionnaire data (1994-2009), 144 high and 66 low consumers of fruit and vegetables (F&V) were selected from the SU.VI.MAX2 cohort. Morning spot urine samples were analyzed by UPLC-QTOF with positive and negative electrospray ionisation. Subgroups of low and high consumers were selected for each of the 20 foods from reported consumption, excluding from each selection any subject with a high intake of other foods. Data were treated with both univariate (Anova with BH correction) and multivariate analysis (PLS-DA) performed after an Orthogonal Signal Correction (OSC). Good discriminations were observed for most foods, but particularly for 10 foods that are frequently consumed and rich in phytochemicals. The number of significant ions ranged from 133 for coffee to 428 for apple. Some of these discriminants, although highly correlated with consumption of the target food, were not specific enough to make good candidate biomarkers. The long-term low and high consumption of F&V were also clearly reflected in the urine metabolomes, mainly through variations in endogenous metabolites. The most discriminating and specific ions are being currently identified and several new biomarkers have already been identified in coffee. The study provided a useful insight into the conditions for success and the limitations of the approach of applying metabolomics to cohort samples for rapid discovery of a wide range of nutritional biomarkers.

ANR Phenomenep ALIA-2010-007; Conseil Regional Auvergne-FEDER post-doc grant (YF)