Metabolomic approach determine exposure to bioactive compounds after consumption of tropical highland blackberry (Rubus adenotrichus) juice


To cite this version:

j.M. Fallas-Ramírez, Claudine Manach, Jean-Francois Martin, Bernard Lyan, Estelle Pujos-Guillot, et al.. Metabolomic approach determine exposure to bioactive compounds after consumption of tropical highland blackberry (Rubus adenotrichus) juice. 6. Journée scientifique du CNRH Auvergne, Nov 2013, Clermont-Ferrand, France. 2013, 6ème Journée scientifique du CNRH Auvergne. hal-02747226
Metabolomic approach determine exposure to bioactive compounds after consumption of tropical highland blackberry (Rubus adnenticus) juice

2Fallas-Ramírez JM, 2Manach C, 2,3Martin JF, 2,3Yan B, 2,3Estelle Pujos-Guilhot, 4,5Vaillant F.

1Instituto de Investigaciones Farmacológicas (INFAR), Universidad de Costa Rica, San José, Costa Rica
2INRA, UMR 1019, Human Nutrition Unit, University of Auvergne, CRNH Auvergne, Clermont-Ferrand, France; claude.manch@clermont.inra.fr
3Metabolism Exploration Platform (PFEM), INRA, Clermont-Ferrand, France
4UMR QUALISUD, Centre International de Recherche Agronomique pour le Développement (CIRAD), Avenue Agropolis, TASS/P34, 34398 Montpellier Cedex 5, France
5Centro Nacional de Ciencia y Tecnología de Alimentos (CITA), Universidad de Costa Rica, San José, Costa Rica

INTRODUCTION

Consumption of polyphenol-rich foods continues to be the focus of attention because of their putative impact on human health. Tropical highland blackberry (Rubus adnenticus) juice is widely consumed from Mexico to Ecuador and represents an important source of ellagitannins and other phytochemicals for the population. Using blackberry as a model for other tropical fruits, we have shown how metabolomic profiling can be used to characterize individual exposure to bioactive molecules and their metabolites in a nutritional trial on healthy volunteers.

NUTRITIONAL STUDY DESIGN

Fourteen Costa Rican men consumed for 8 days a daily dose of 250ml of a locally produced and well characterized blackberry juice, as part of a controlled diet. 24hr urines collected before and at the end of the supplementation were analyzed with a non-targeted high-resolution mass spectrometry (UPLC-QToF) method.

ANALYSIS

After pre-processing of LC-QToF data, statistical analyses were applied:
- ANOVA (R)
- PCA and OSC-PLS-DA on log-pareto data (SIMCA 13.0)

RESULTS

The urine metabolome analyzed before (blue) and after (purple) blackberry juice were clearly distinguished by PLS-DA (figure A) with a good validation of the model (Q2cum = 0.744, permutation test n=100). The loading plot shows all detected ions. Red points correspond to VIP higher than 2 and green points correspond to VIP higher than 1.5 (figure B).

CONCLUSION

The metabolomic analysis discriminated the consumption of blackberry juice by the volunteers with more than 60 strong discriminants. Interestingly, the microbial metabolites of urolithins, urolithin A-glucuronide and urolithin B-glucuronide, were the most important discriminants but other ions currently under identification could also contribute to blackberry juice health effects. Correlations will be searched between all discriminant metabolites and the individual capacity to produce UA and UB to further investigate inter individual variation in response to blackberry juice intake.