



HAL
open science

^1H -NMR profiling of tomato samples with benchtop spectrometer

Catherine Deborde, Martine Lemaire, Daniel Jacob, Dylan Bouillaud,
Federico Casanova, Cécile Cabasson, Annick Moing

► **To cite this version:**

Catherine Deborde, Martine Lemaire, Daniel Jacob, Dylan Bouillaud, Federico Casanova, et al. ^1H -NMR profiling of tomato samples with benchtop spectrometer. 15. journées scientifiques du RFMF, May 2023, Perpignan, France. hal-04156153

HAL Id: hal-04156153

<https://hal.inrae.fr/hal-04156153>

Submitted on 7 Jul 2023

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.



Distributed under a Creative Commons Attribution| 4.0 International License

Proposition Poster

¹H-NMR profiling of tomato samples with benchtop spectrometer

Catherine Deborde ^{1, 2, *}, Martine Lemaire ², Daniel Jacob^{1, 2}, Dylan Bouillaud³,
Federico Casanova³, Cécile Cabasson^{1, 2}, Annick Moing ^{1, 2}

1 : MetaboHUB-Bordeaux

Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE), Université de Bordeaux (Bordeaux, France)

2 : Biologie du fruit et pathologie

Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (INRAE), Université de Bordeaux (Bordeaux, France)

3 : Magritek GmbH, Philipsstraße 8, 52068 Aachen, Germany

* : Auteur correspondant

Metabolic phenotyping or metabolomics of tomato fruit is well documented and easily monitored for fruit sampling at a given stage of development especially for whole fruit or for pericarp tissue. A detailed characterization of fruit development by quantitative NMR metabolomics of cultivated tomato fruit tissue¹ and pericarp of tomato fruit mutant lines² has been published recently at high field NMR. To widen the interest of such an NMR-based approach, decreasing the analytical cost and increasing the analytical throughput are of interest. Therefore, the main objective of this work was to test the ability of benchtop NMR to discriminate two tissues of tomato fruit (pericarp and locular tissue) at four stages (Mature-green, Breaker, Orange and Red-ripe) and to quantify the major soluble sugars and organic acids.

¹H-NMR spectra of the same tomato hydromethanolic extracts were acquired with water presaturation at 80 MHz (Magritek, Aachen, Germany) and at 500 MHz (Bruker, Wissembourg, France). They were processed with NMRProcFlow³ (nmrprocflow.org) for targeted and untargeted analysis (ERVA⁴ method), and the data were analyzed with univariate or multivariate statistical analyses.

We report on our first results of these comparisons of tomato tissue profiling by ¹H-NMR spectroscopy at 80 and 500 MHz. Benchtop NMR analysis of fruit tissue extracts could be proposed to biologists studying tomato or other fleshy fruits, to characterize fruit development of wild-types and mutants in a greenhouse, or to phenotype large series of genotypes.

Funding: MetaboHUB-2.0 (ANR-11-INBS-0010) and the INRAE BAP IB2019_GelSeed project.

References

- 1: Lemaire *et al.* 2019 doi :[10.3390/metabo9050093](https://doi.org/10.3390/metabo9050093)
- 2: Musseau *et al.* 2020 doi :[10.1105/tpc.20.00245](https://doi.org/10.1105/tpc.20.00245)
- 3 : Jacob *et al.* 2017 doi:[10.1007/s11306-017-1178-y](https://doi.org/10.1007/s11306-017-1178-y)
- 4 : Jacob *et al.* 2013 doi:[10.1007/s00216-013-6852-y](https://doi.org/10.1007/s00216-013-6852-y)