



# In vitro interactions of plant extracts designed to prevent non-alcoholic hepatic steatosis with human gut microbiota





UNIVERSITY

La Région Auvergne-Rhône-Alpes

Auriane Bron<sup>1,2</sup>, Florian Le Joubioux<sup>3</sup>, Sylvain Denis<sup>1</sup>, Tom Van de Wiele<sup>2</sup>, Marie Vallier<sup>4</sup>, Yolanda Otero<sup>4</sup>, Stéphanie Blanquet-Diot<sup>1</sup>

<sup>1</sup> Université Clermont Auvergne, INRAE, UMR 454 MEDIS, Microbiologie Environnement Digestif et Santé (MEDIS), CRNH Auvergne, Clermont-Ferrand, France, <sup>2</sup> Ghent University, Faculty of

Bioscience Engineering, Center for Microbial Ecology and Technology (CMET), Ghent, Belgium, <sup>3</sup> Valbiotis R&D Périgny Center, Périgny, France, <sup>4</sup> Valbiotis R&D Riom Center, Riom, France.



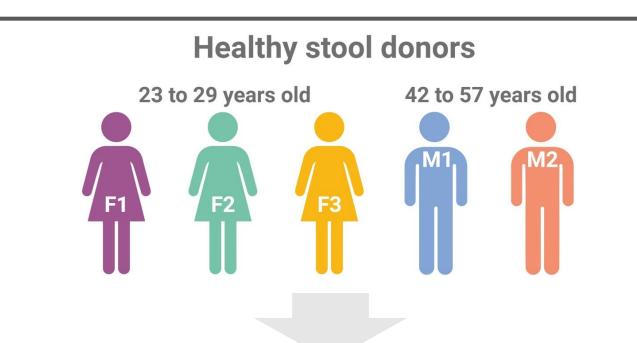
#### Introduction

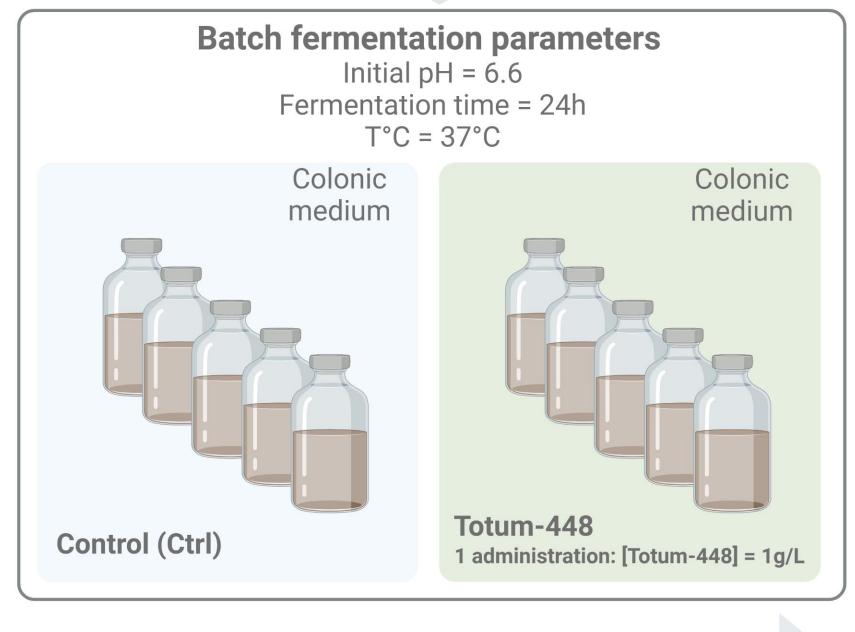
Non-alcoholic fatty liver is a highly prevalent disease that, if untreated, can progress to non-alcoholic steatohepatitis (NASH). An interplay between western diet and gut microbiota has been reported to be involved in its development (Aron-Wisnewsky et al. 2020). Nutritional strategies can be used to prevent NASH development. In particular, plant extracts, with a great diversity of bioactive molecules including polyphenols and fibers, are a promising approach for a multitargeted strategy against the disease (Nakano et al. 2020). In this context, the aim of this study was to investigate the interactions of Totum-448, a combination of plant extracts designed to prevent NASH, with gut microbiota from healthy human origin, using batch colonic fermentation assays.

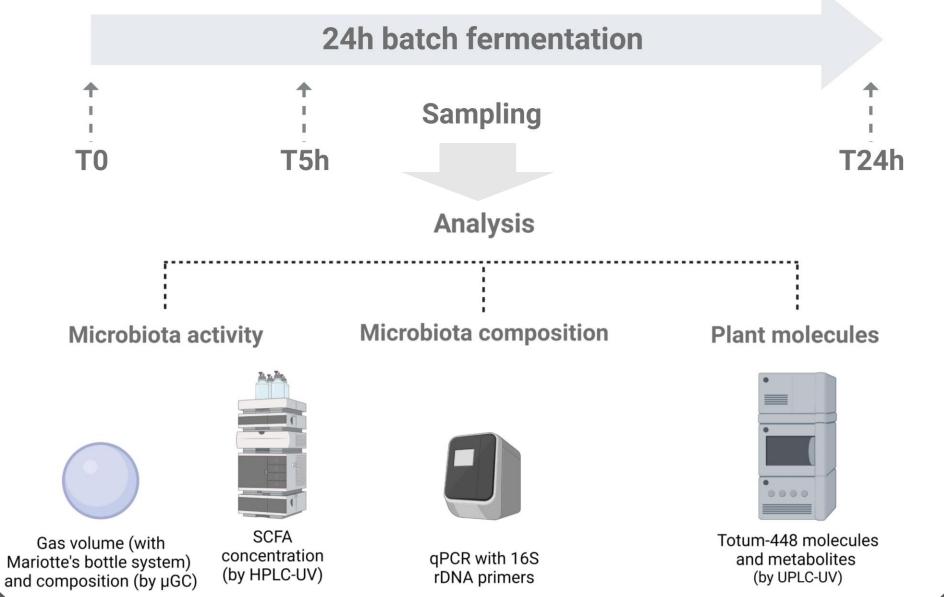


- Identify the effects of Totum-448 molecules on human gut microbiota composition and metabolic activities
  Evaluate the potential metabolization of Totum-448 by the gut microbiota

#### Materials & Methods







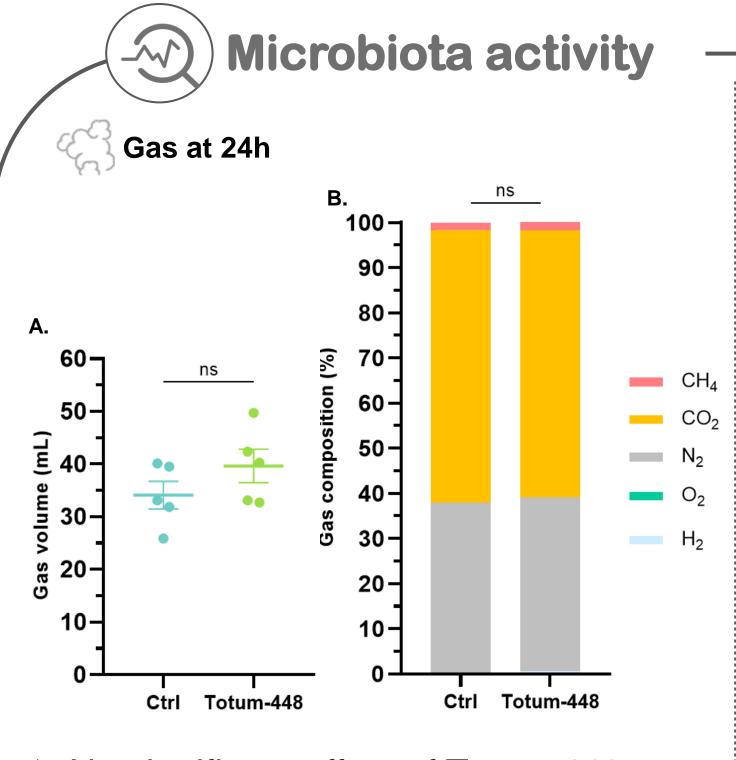
#### Conclusion

- ❖ No significant effect of Totum-448 on a healthy human gut microbiota activity and composition despite interindividual variability
- role of gut microbiota in plant extracts Key bioavailability through very efficient metabolization of Totum-448 polyphenols regardless the donor

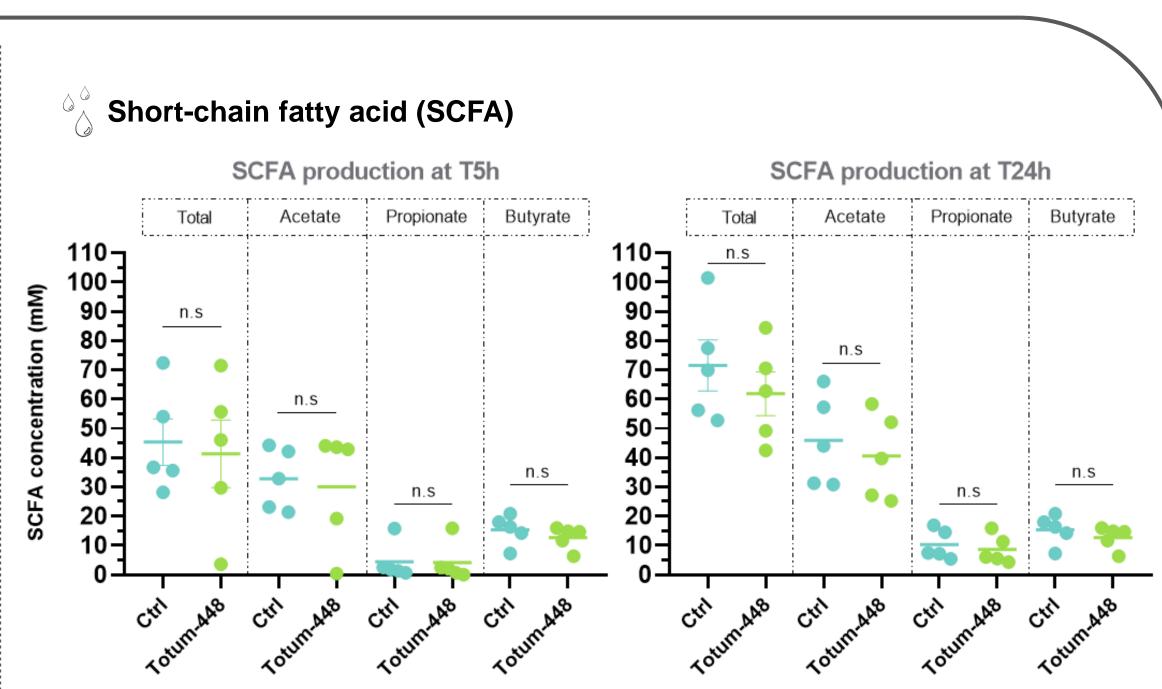
### Perspectives

- Further metabarcoding analysis of gut microbiota for an in-depth study of Totum-448 effects
- ❖ Additional identification of Totum-448 metabolites
- Impact of repeated Totum-448 administration on gut microbiota composition and activities
- ❖ Further studies on Totum-448 effects using a more complex model of human gut microbiota, such as the mucosal artificial colon (M-ARCOL)

### Results



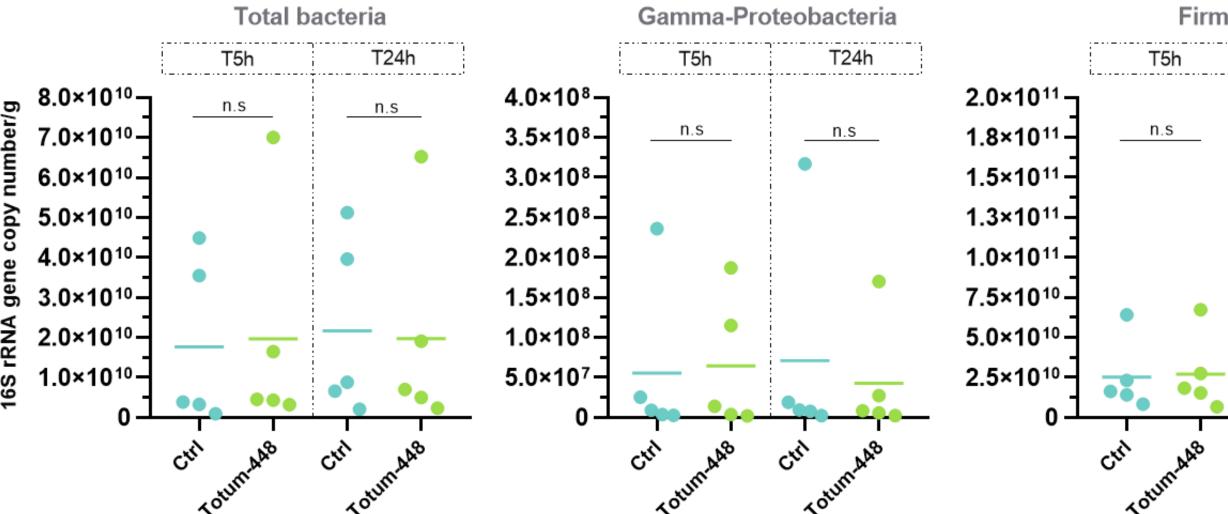
❖ No significant effect of Totum-448 on gas production (A) and composition (B) at 24h (n=5)



❖ No significant effect of Totum-448 on SCFA production and composition regardless the sampling time (n=5)

⇒ No effect of a single administration of Totum-448 on the healthy human gut microbiota activity

## Microbiota composition

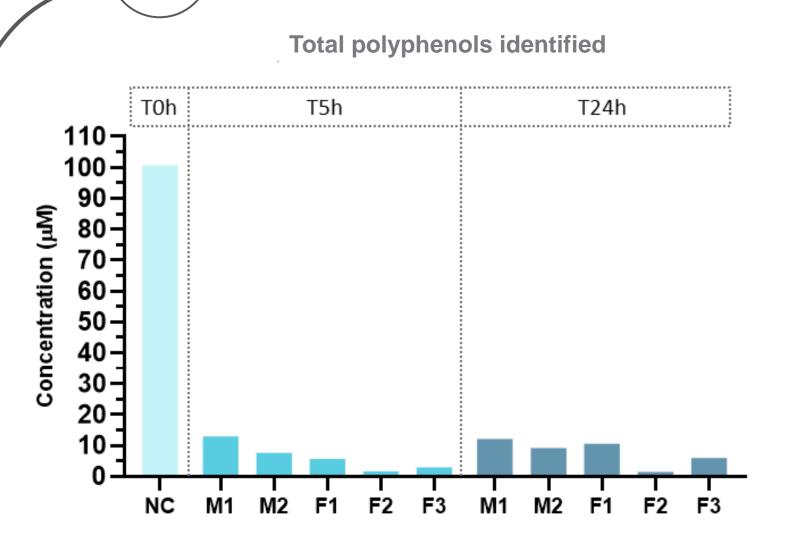


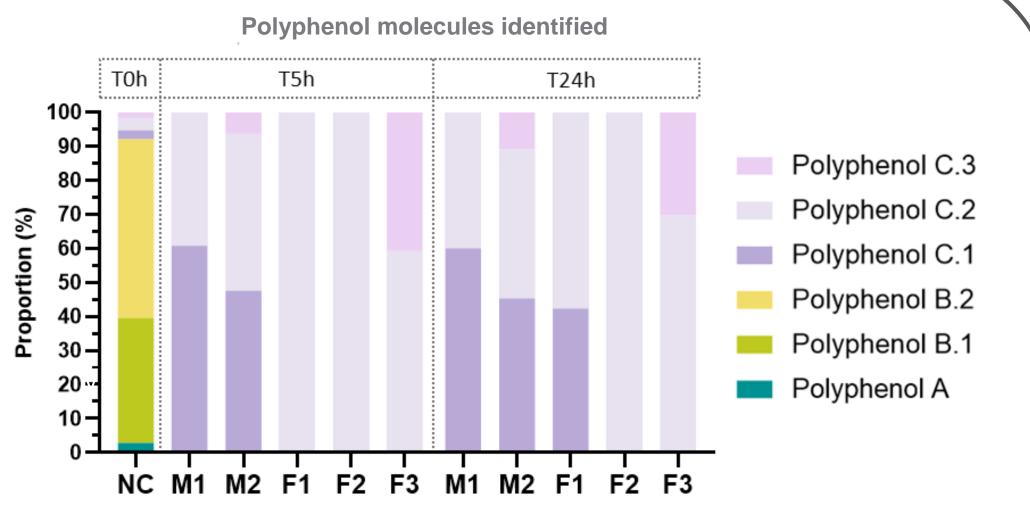
❖ No significant effect of Totum-448 on total bacteria load and targeted populations regardless the sampling time

**Firmicutes Bacteroidetes** 3.5×10<sup>11</sup>-3.0×10<sup>11</sup> 2.5×10<sup>11</sup> 2.0×10<sup>11</sup> 1.5×10<sup>11</sup>-1.0×10<sup>11</sup>· 5.0×10<sup>10</sup>-

⇒ No major effect of a single administration of Totum-448 on the healthy human gut microbiota composition

## Plant molecule metabolization





NC: negative control

n.s: not significant

n.s = not significant

Metabolization of polyphenols by human gut microbiota within few hours of fermentation

Apparition of new polyphenols metabolites during the fermentation process

⇒ Very efficient metabolization of Totum-448 polyphenols by human gut microbiota



