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How metabolomics is used to support the MetaPath solution through metabolic profiling of cheese fermentation industry ecosystem models ?

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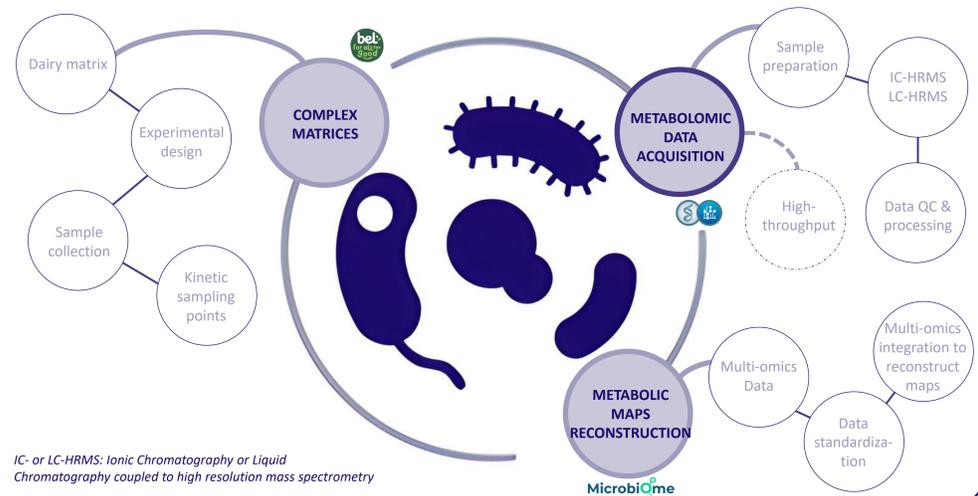
² MetaboHUB-MetaToul, National Infrastructure of Metabolomics and Fluxomics, Toulouse, 31077, France

Introduction

Consumer expectations and societal evolutions are at the heart of the concerns of fermentation professionals. The organoleptic properties of their products are closely correlated to its manufacturing process but also to its composition specifically the microbial ecosystems introduced to produce this fermentation.

In this context, the Bpifrance MetaPath project aims to reconstruct the metabolic maps of these microbial ecosystems in order to guide the industrialist in the selection of microbial strains at the time of product design. This will enable them to better control and understand the organoleptic properties of finished products in a natural way, in line with consumer expectations. As a partner in the MetaPath project, the MetaToul platform aims to perform metabolic profiling of ecosystems in the cheese model of industrial partner Bel.

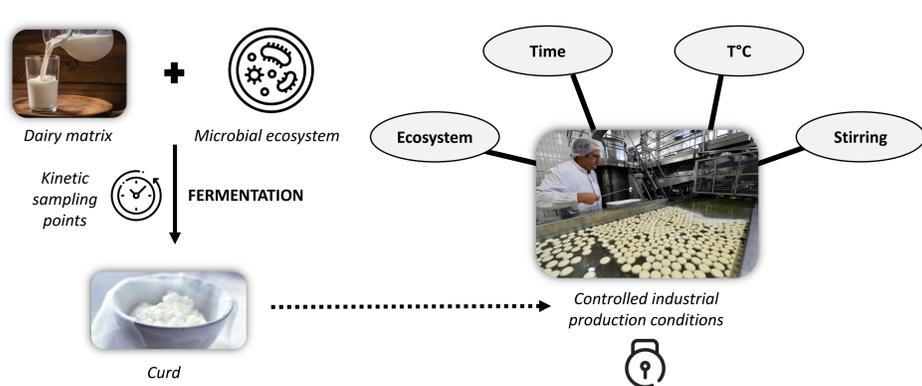
Material and methods



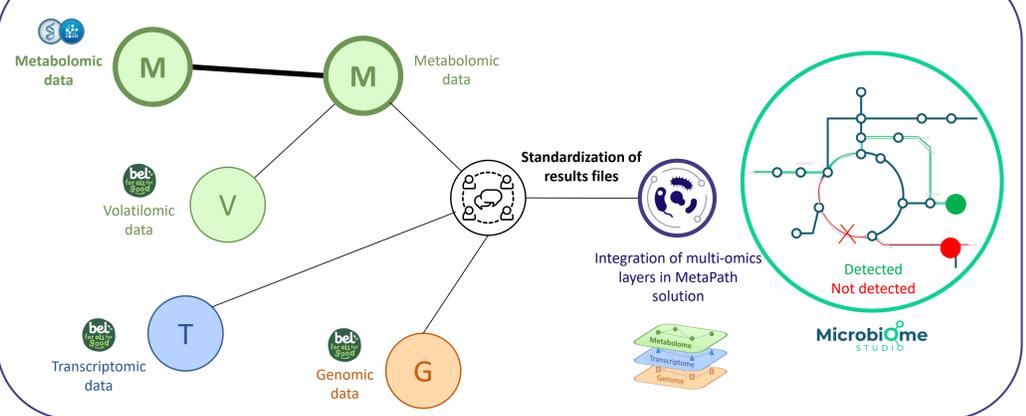
IC- or LC-HRMS: Ionic Chromatography or Liquid Chromatography coupled to high resolution mass spectrometry

Results and discussion

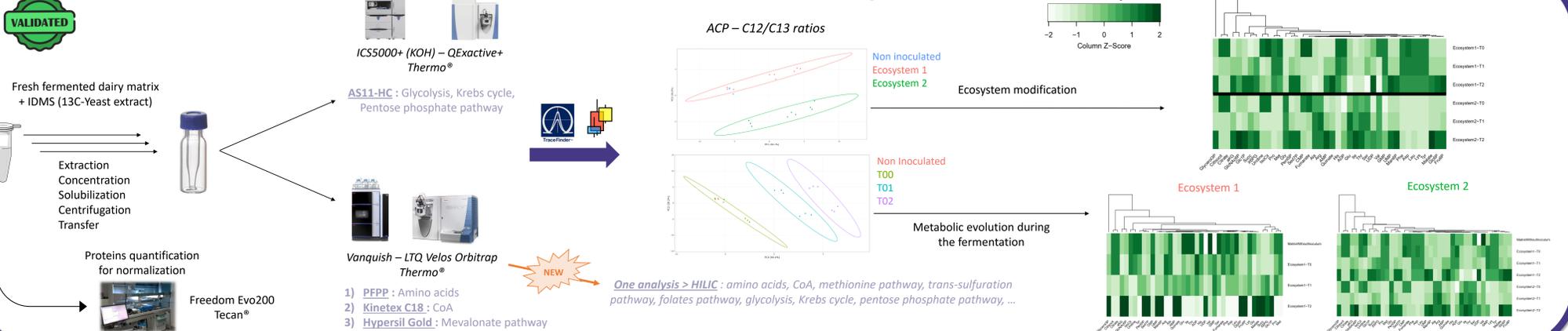
1- COMPLEX MATRICES



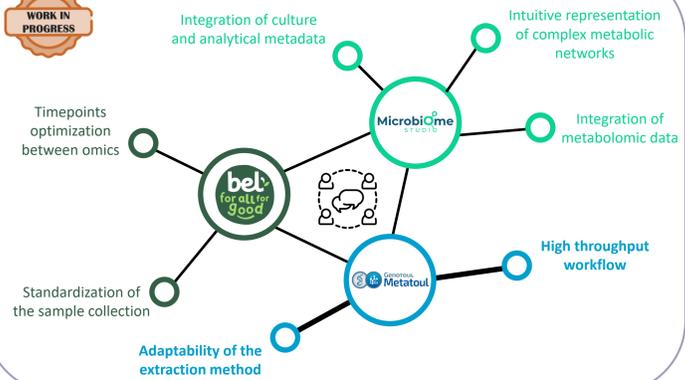
3- METABOLIC MAPS RECONSTRUCTION



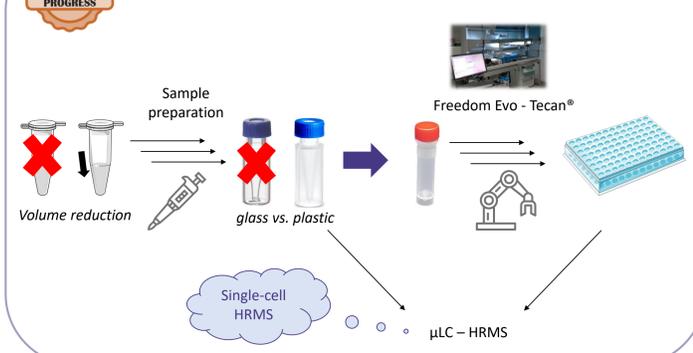
2- METABOLOMIC DATA ACQUISITION



ECOSYSTEMS MODELS EVOLUTION



MINIATURIZATION & AUTOMATIZATION



ECORESPONSABILITY

	Actual	Miniaturized	+ Automated
Sample preparation			
g eCO2 / sample	4.26	3.62	3.33
€ / sample	0.70	0.52	1.14

Analysis WORK IN PROGRESS

* Consumables only, without gloves

Conclusions

Different sampling and sample extraction systems have been validated to this day on this complex cheese matrix. It allows the detection of central and energetic metabolism but also of a wider detection. We currently cover the main pathways of the studied microorganisms such as glycolysis, Krebs cycle, pentose phosphate pathway and mevalonate pathway. This system is validated and is used for the reconstruction of metabolic maps of the studied ecosystems by Abolis / Microbiome Studio partner. The planning of the final sampling phase remains to be discussed in order to control the production of high throughput metabolomic data.

Acknowledgments

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