



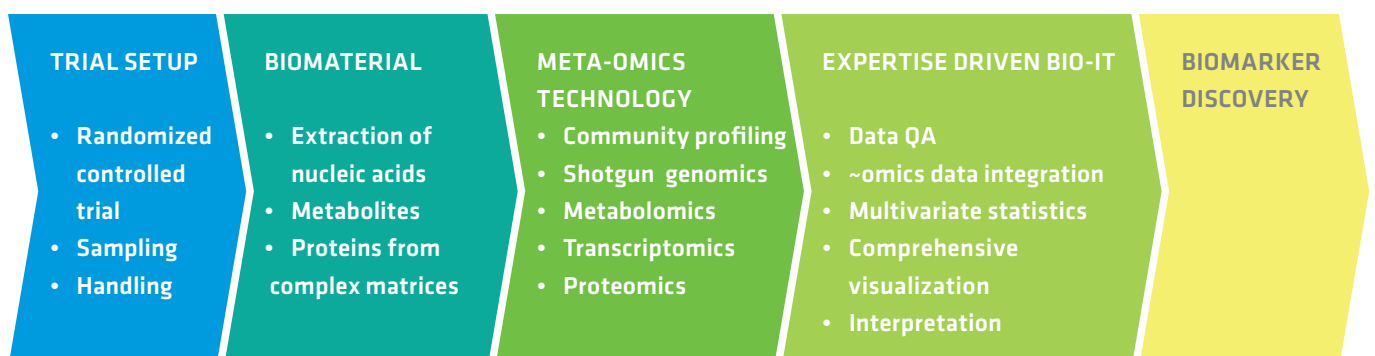
DISCOVERING THE ROLE OF MICROBIOTA IN HEALTH

Complex communities of microbes – microbiota – are found everywhere: in soil, in (fermented) foods, and both on and inside the human body. Growing evidence suggests that the microbiota are intimately connected to the immune system and help in modulating fundamental processes at the metabolic level or the cellular level. Hence, targeting of the microbiome might be an effective treatment strategy for specific disorders of the gut, skin or oral niche, but may

also reduce everyday complaints such as constipation, body odour, bad breath, recurrent infections and dandruff. At NIZO, we have profound knowledge and experience in applying different techniques to determine microbial diversity. Furthermore, we can identify key microbial players or functions within the community related to human or animal health, food safety, crop development and fermentation.

Microbiota profiling can be done in several ways. At NIZO, we have state-of-the-art microbiota profiling and quantification platforms at our disposal. We have a unique combination of domain knowledge experts and proprietary tools for niche-specific sampling, nucleic acid isolation, purification, sequencing and analyses of microbial communities.

Our unique bio-IT pipeline enables handling of data from single-strain genomes, 16S and shotgun metagenomics, and metatranscriptomics. It includes a multitude of univariate and multivariate statistical models and machine learning algorithms for the identification of microbial biomarkers and microbes with functions related to health and disease.



IN SILICO

- Comparative genomics
- Text mining
- Compound discovery

IN VITRO

- Cell lines
- Micromodels
- High throughput screening

PROOF OF CONCEPT

- Human trial (challenge)
- Processing centre
- Intellicap

We have in place several in silico and high-throughput in vitro micromodel systems of different ecological human niches, microbe-host cell interactions and food products. This enables us to discover microbiome modulators affecting metabolic

activity, key community members, population structures and health-promoting metabolites that can be validated by proof of concept studies in humans or under pilot scale process conditions in our processing centre.

TRACK-RECORD

To date, we have applied our microbiota profiling pipeline to over 30 different environmental niches, ranging from the human gastrointestinal tract to plant leaves, and identified over 800 different microbial genera representing a broad spectrum of bacterial taxonomy and even beyond (archaea and fungi). In most microbiota studies at NIZO, we focus on identifying the differences in microbiota

composition after different interventions. Examples of interventions we have studied are changes in diet, skin disruption, and optimizing processing conditions. In many cases these studies resulted in the identification of microbial taxa that are closely linked to the intervention and generated new insights for our clients into how to better control and steer the microbiota.

TECHNOLOGY

Samples from the various in vitro, proof of concept or randomized control studies can be taken and analysed using various different -omics techniques (e.g. community profiling, shotgun metagenomics, metabolomics). For the interpretation of these complex data we use various analytical and visualization tools designed for the analysis of genomics data. These tools can also be applied to other large, complex datasets

(big data). In addition, text mining algorithms developed by our experts are used to complement the conclusions from microbiota and genomics studies with scientific literature or patent databases. Coupled with the knowledge of our experts in the fields of fermentation, gut health, immunity and food safety this results in solid conclusions on the relation of the microbiota to a food product or (human or animal) health.



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ABOUT US: The growing world population needs better food: healthier, tastier, more affordable and produced more sustainably. We know better food is essential for better health. Our passion is accelerating innovations together with our customers, applying our combined expertise in bacteria, proteins and processing. Together we deliver sustainable solutions for better food and health.



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