



BioEconomy
Research & Advisory

Unlocking the potential of Microbiome Research for Circular Biobased Europe

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Microbiome (MB) research is not prominently placed in Horizon Europe Research and Innovation programs

Recommending a Proactive Microbiome Strategy:

- Initiate consortia, addressing global challenges, where microbiome insight can contribute significantly
 - Food security (*MB: more robust plants*)
 - Drought tolerance (*MB: improved roots, nutrient & water efficiency*)
 - Soil fertility (*Diverse and Healthy soil MB*)
 - Public Health (*MB: Gut-health-promoting food ingredients*)
 - Stopping Biodiversity loss (*MB: Reducing need for pesticides*)
 - Antibiotic Resistance and spread (*MB: Gut-health improving feed*)
 - Be prepared for new pandemics (*MB: Early warning, virus, bacteria and AMR*)



Dedicated Microbiome Research consortia: Focus on increased understanding of microbiome interaction

- **Expand metagenomic sequencing to include all types of organisms**
 - Not just bacteria and archaea: also protozoae, fungi and viruses
 - Elucidating their role and interaction
- **Focus on the microbiome functional interaction with host and substrate**
 - Elucidate the composition of the microbiome-secretome
 - Functional annotation of digestive secretome (CUPP online web-based tool)
 - Functional annotation of signaling between host and microbiome

CUPP, Peptide-based Functional Annotation, References

Barrett, K and Lange, L, 2019: Peptide-based functional annotation of carbohydrate-active enzymes by conserved unique peptide patterns (CUPP). *Biotechnol Biofuels* (2019) 12:102

Barrett, K, Hunt, CJ, Lange L, and Meyer, AS, 2020: Conserved unique peptide patterns (CUPP) online platform: peptide-based functional annotation of carbohydrate active enzymes. *Nucleic Acids Research*, 2020, Vol. 48.
<https://doi: 10.1093/nar/gkaa375>



Take a *microbiome-holistic perspective* on new lead-findings within microbiome composition & function

By going across microbiome systems, answering the question:

- Can we find conceptually new insight in the organization and regulation of microbiomes? Functioning as one complex organism?
- If so: How can we use such new insight for designing new applications, improving microbiome of soil, plants, animals, people, environment and buildings?



The importance of Microbiome Health for Public Health

Use of bio-based products, made from upgrade of residues and sidestreams:

- Gut health improving food ingredients -prebiotic and probiotic effects
- Reducing use of pesticides through BioAg products
- Reducing risk of antibiotic resistance through gut-health animal feed



Empowering Regulatory skills within microbiome-modifying products

- **Acute need:** Timely approval of safe products, adding value for man, plants, animals and environment

Examples

- Waiting time much too long for prebiotic and probiotic food & feed
- Much too much is referred to Novel Food approval (e.g. fungal mycelium of edible fungi)



Much needed: Improved and Pro-active, local & global Microbiome knowledge-sharing

- It is a matter of **ethics**, to share efficiently and proactively what can be of such importance for so many and for planetary health at large
- A paper about **Microbiome Ethics**, is in review, co-authored by Microbiome Support CSA scientists from 14 countries of 5 continents



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Thanks a lot for your kind attention

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