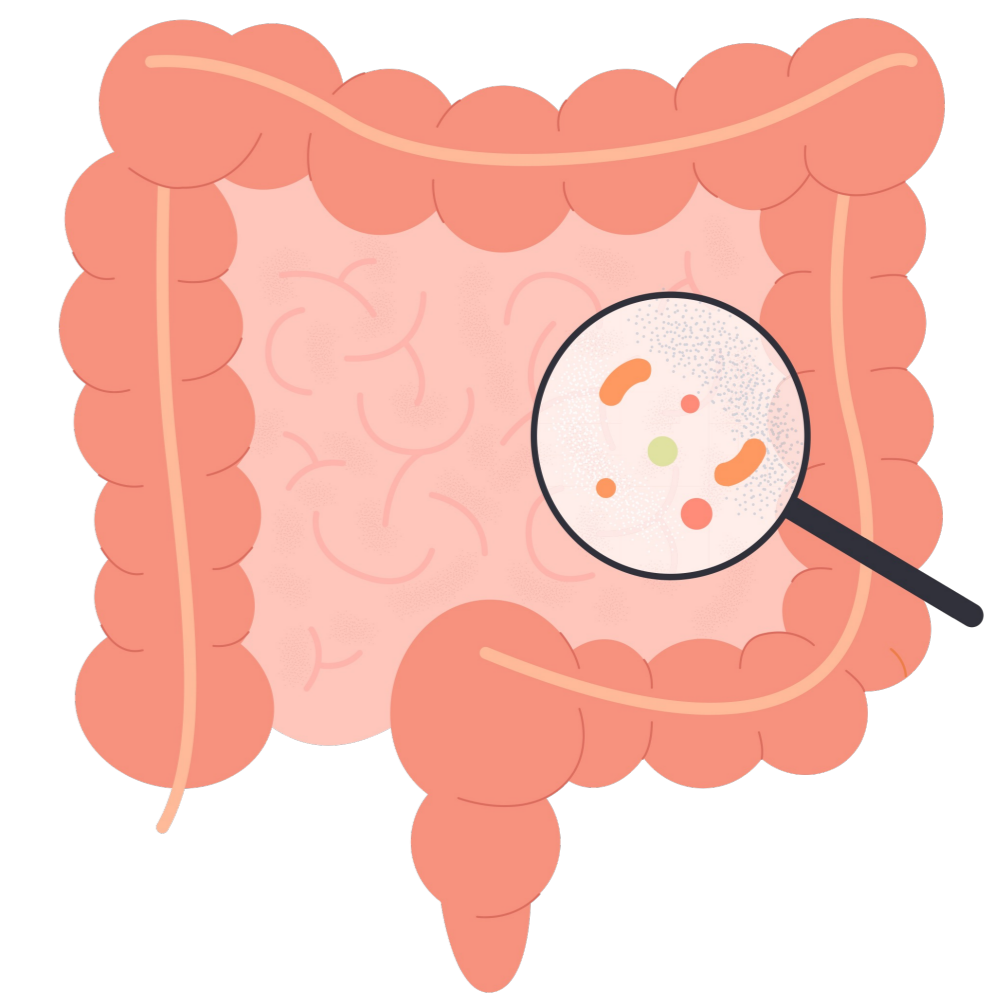


# Dietary carotenoids and their modulation of intestinal microbiota



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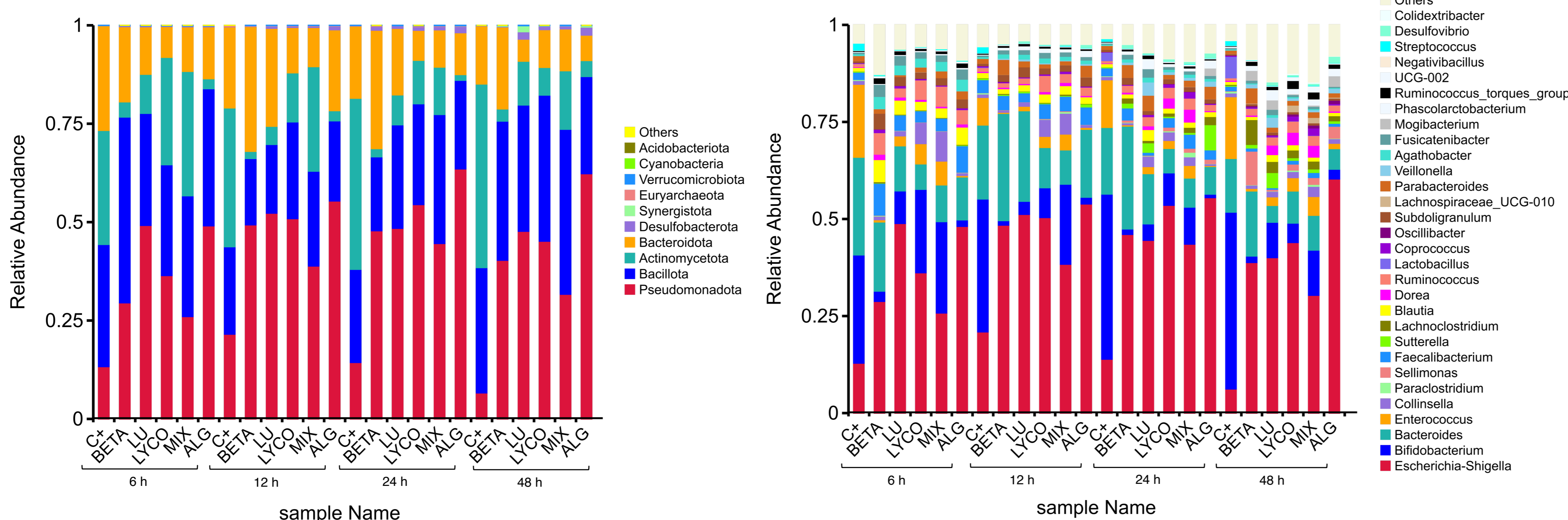
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## Introduction

Annually, 41 million deaths are linked to Non-Communicable Diseases (NCDs), often due to poor diets, emphasizing the importance of health-recommended fruits and vegetables. Carotenoids, lipid-soluble compounds found in plants, bacteria, microalgae, and fungi, offer antioxidant protection and promote cardiovascular health and anti-inflammatory effects. The efficiency of carotenoids is influenced by the intestinal microbiota (IM), which plays a crucial role in their absorption and metabolism. Dietary changes can impact the IM, affecting microbial proliferation and the production of metabolites crucial in diseases. Despite their significance, there's a research gap in understanding carotenoids' colon metabolism and interactions, necessitating further exploration.

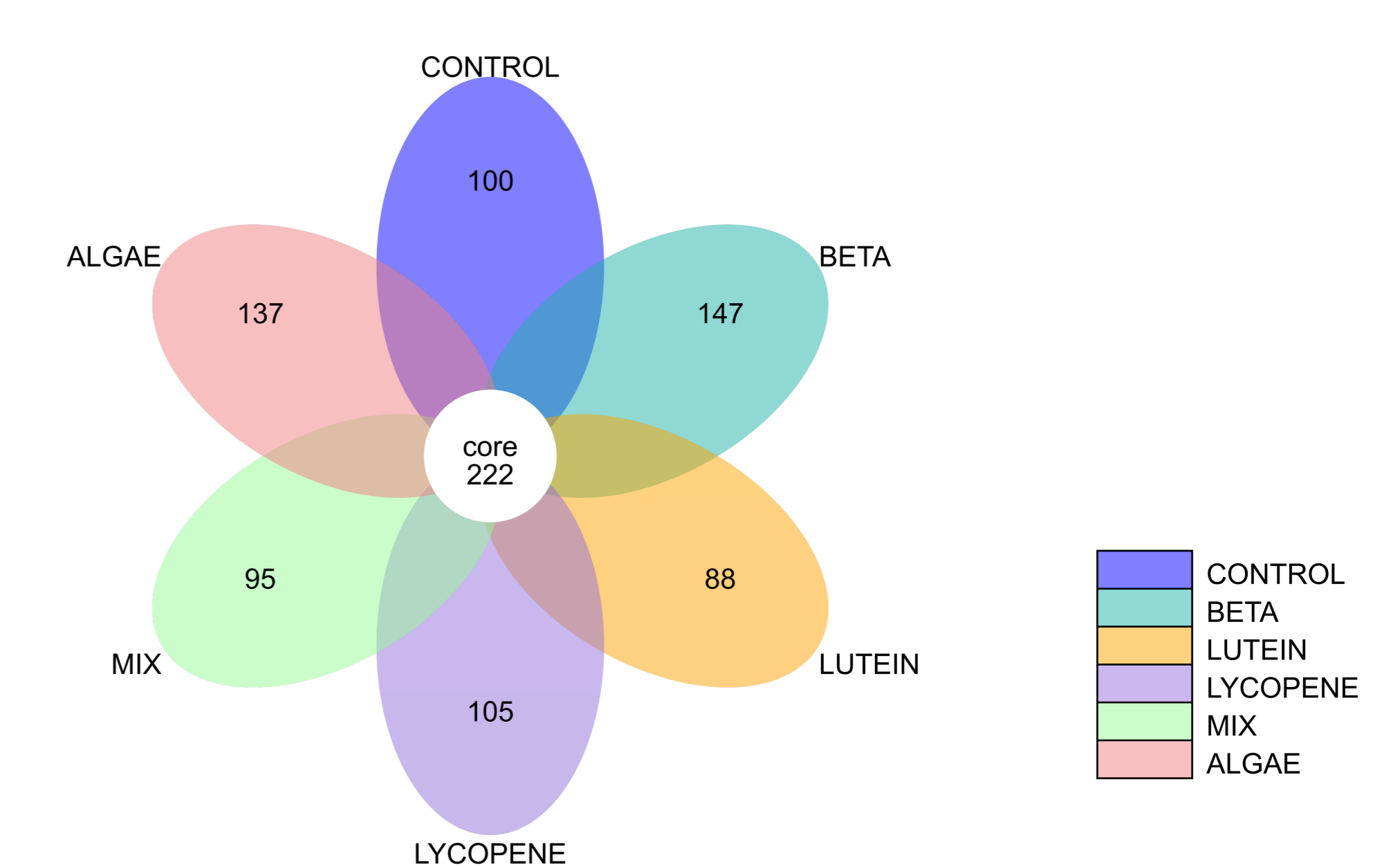
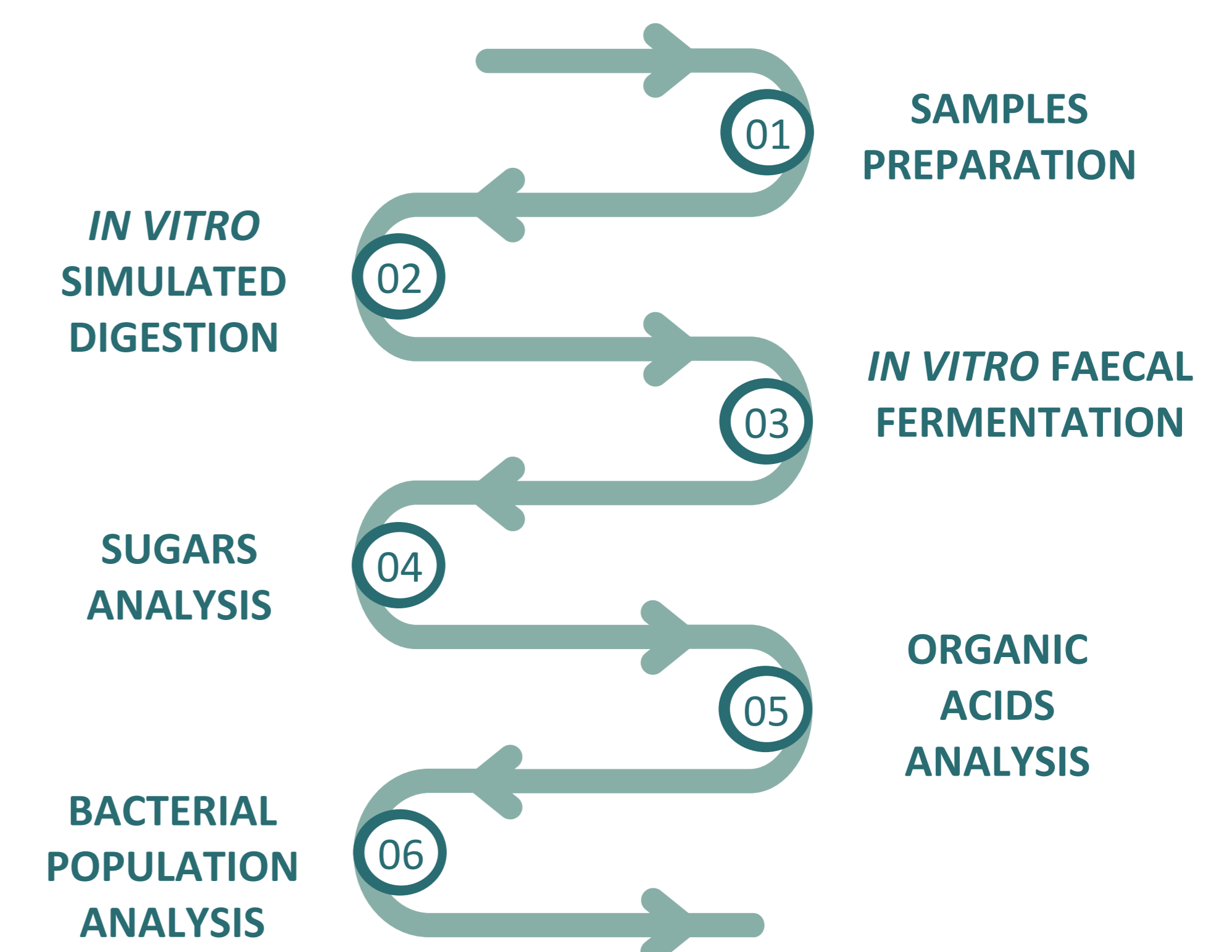
The study aimed to evaluate the effects of digested beta(β)-carotene, lutein, and lycopene, a mixture of these pigments, and *Osmundea pinnatifida* solutions on the metabolic and population dynamics of the intestinal microbiota.

## Results

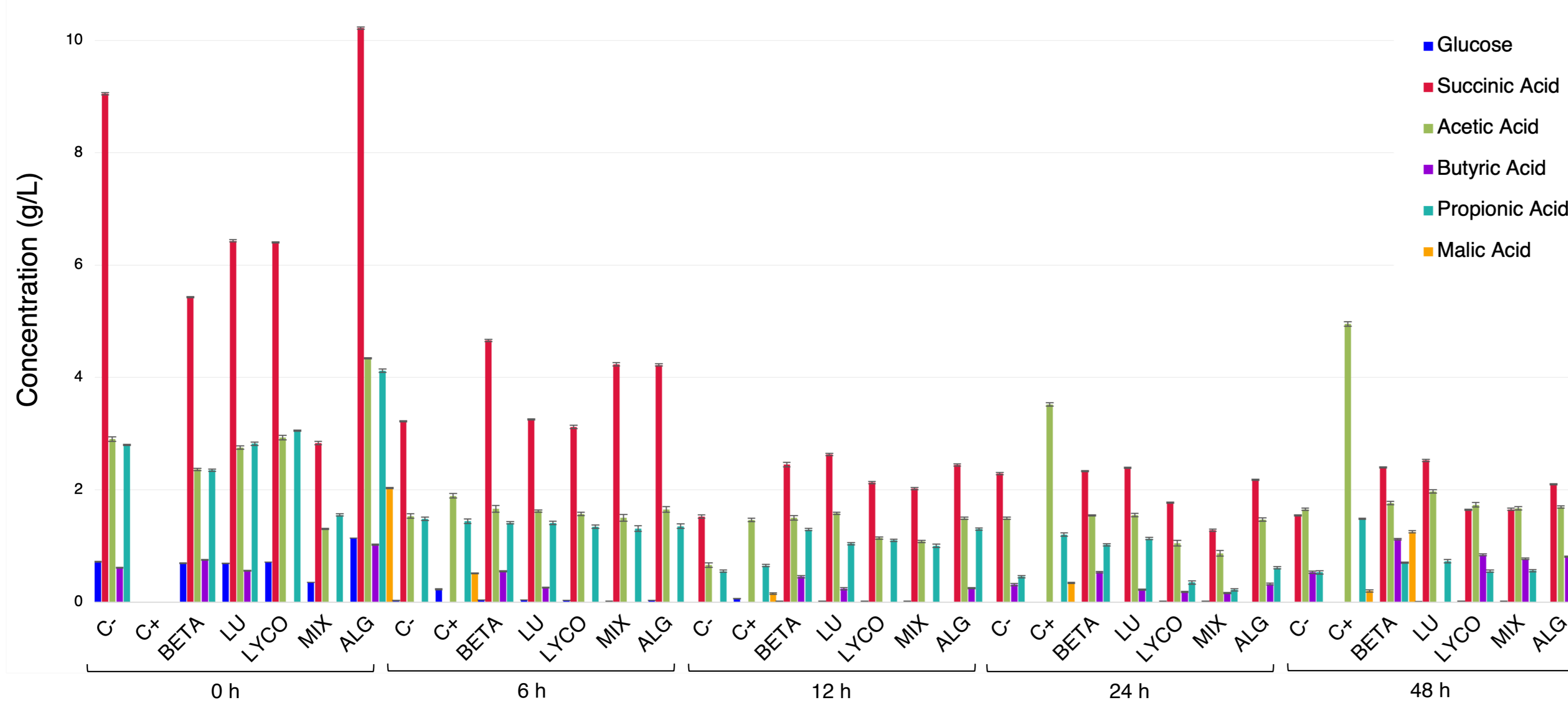


**Figure 1.** Phyla (a) and genera (b) relative taxonomic abundance (RA) from each tested conditions at each time-point. (C-: negative control; C+: positive control; BETA: β-carotene; LU: lutein; LYCO: lycopene; MIX: mixture; ALG: *O. pinnatifida*).

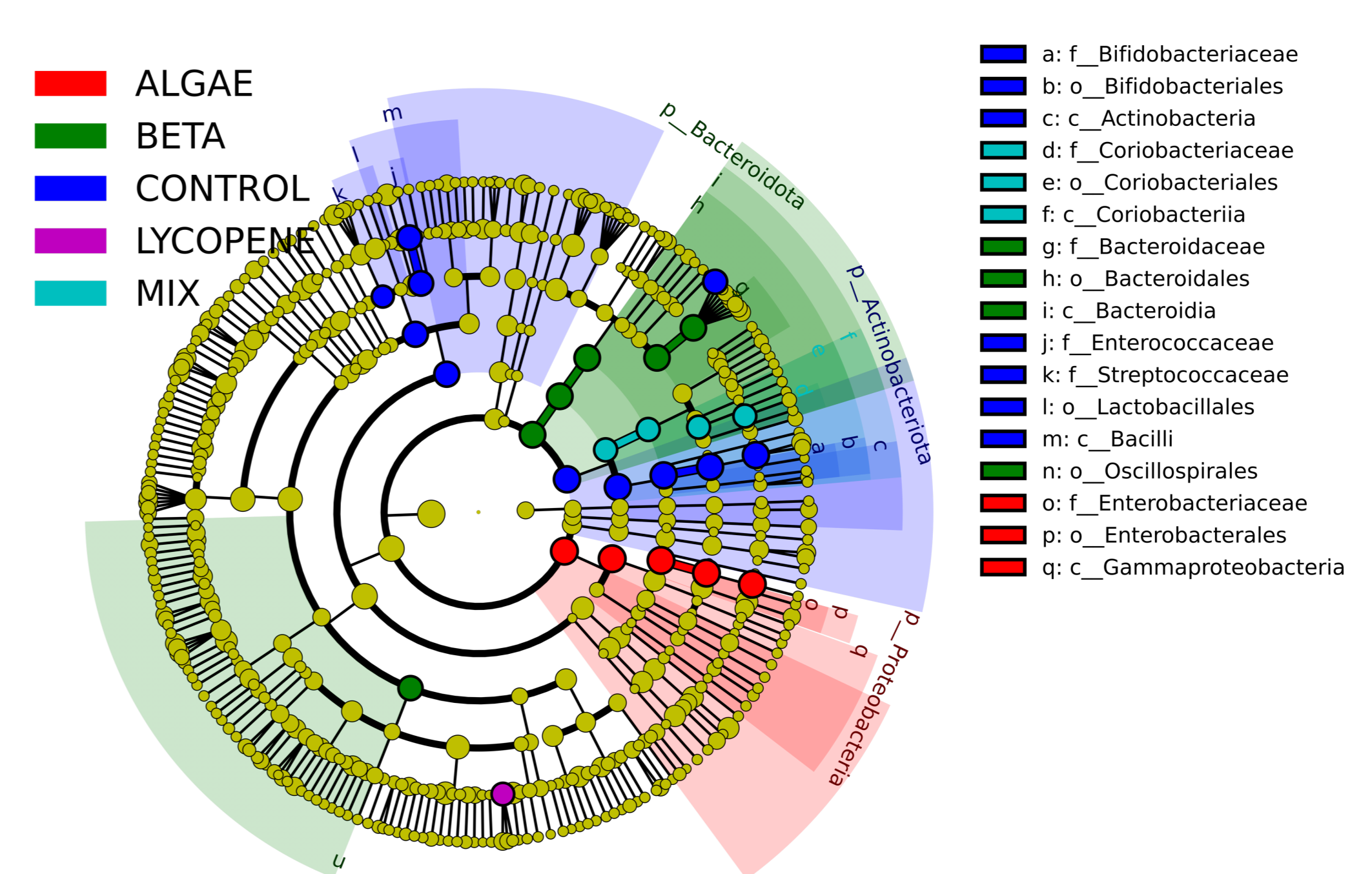
## Methodology



**Figure 2.** Flower diagram of each sample group.



**Figure 3.** Concentrations (mean ± SD) of glucose consumed and organic acids released, in g/L, during the 48 h of incubations in the presence of the carotenoids' sample groups, after simulated digestion.



**Figure 4.** Graphical representation of phylogenetic relationships (Cladogram).

## Conclusions

- In the presence of carotenoid samples, the IM was mainly composed of *Bacteroidota*, *Bacillota*, *Pseudomonadota* and *Actinomycetota* phyla, promoting the growth of *Lachnospiraceae* bacteria while reducing the RA of *Lactobacillus*, *Enterococcus*, *Streptococcus* and *Bifidobacterium*
- The Lycopene and Mix groups exhibited similar microbial compositions, whereas the β-carotene and Alga groups fostered a more diversified microbiota;
- The bacteria in the IM used glucose as a carbon source and were stimulated to produce significantly essential organic acids such as succinic, acetic, butyric and propionic acids.

## References

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