The Hydrogenome of Natural Mineral Waters: Contrasting Characteristics at Harvesting Sites and Water Storage Tanks

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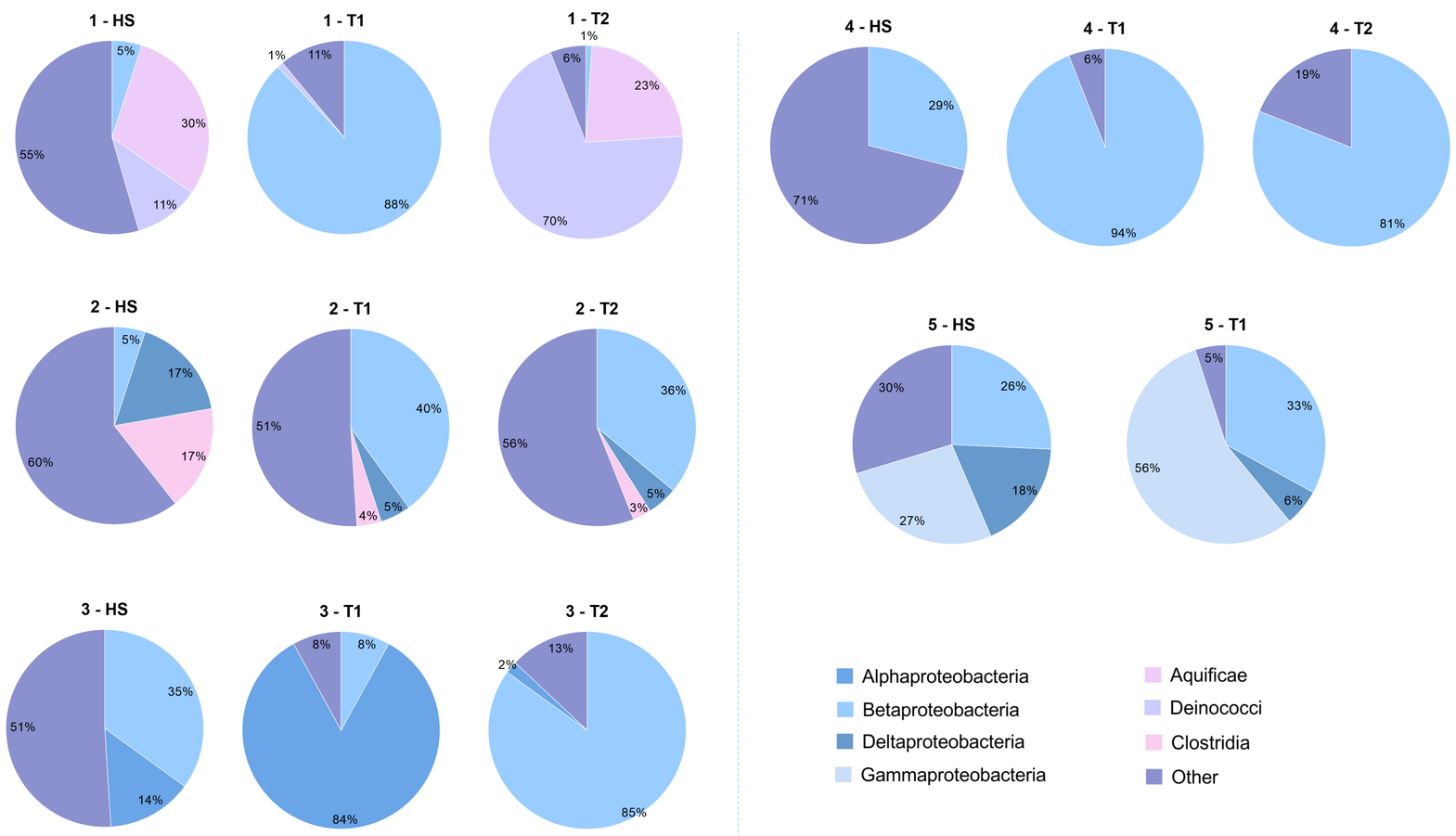
INTRODUCTION

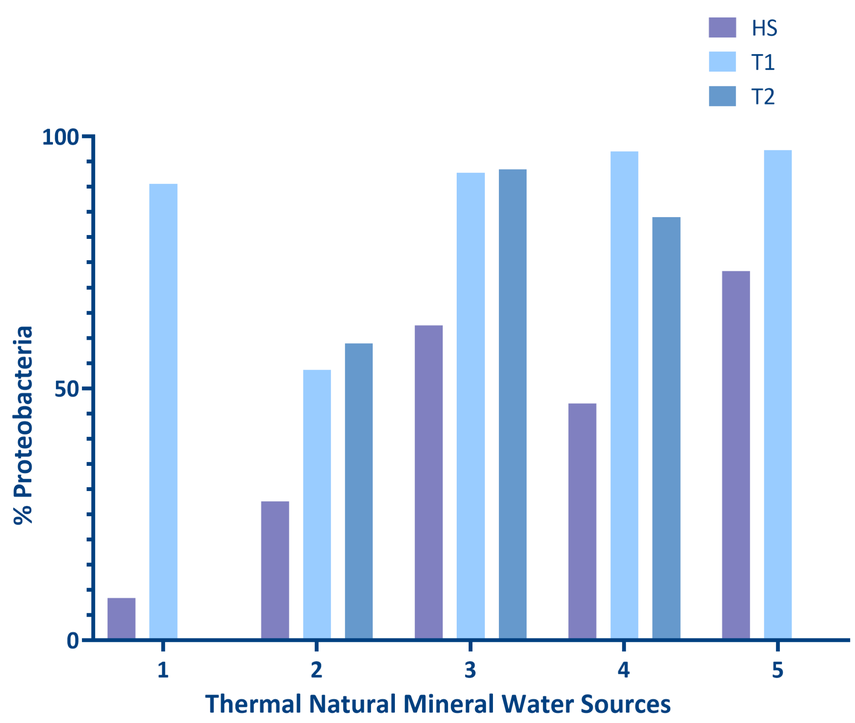
Thermal natural mineral water (TNMW) is valued for its health benefits, influenced by its physicochemical and microbial characteristics, which, in turn, are affected by factors such as temperature. Recent research has focused on characterising the microbiome (hydrogenome) of TNMW using 16S metagenomics, primarily in TNMW obtained from harvesting sites. However, in Portuguese thermal spas, TNMW is often temporarily stored in tanks, which, despite regular sanitisation, can impact the growth and diversity of microorganisms. This study aimed to compare the hydrogenome of TNMW samples collected from harvesting sites and water storage tanks in Northern Portugal.

MATERIALS & METHODS

RESULTS

The results indicated alterations in the hydrogenome of the analysed TNMWs, with higher levels of bacteria classification (phylum and class) and lower levels (genus) being affected. Proteobacteria emerged as the predominant phylum, exhibiting increased detection in harvesting sites compared to storage tanks, in four out of five TNMW sources. At the class level, an increase in Betaproteobacteria was observed in seven out of nine storage tanks. At the genus level, all samples exhibited distinct predominant bacterial groups. Consequently, the effects of TNMW on thermal spa treatments may diverge from predictions solely based on the hydrogenome composition of TNMW samples from harvesting points.





CONCLUSION

These findings underscore the considerable bacterial diversity in all tested samples, emphasising the need for thermal spas to consider the role of TNMW storage in tanks when assessing the effects of thermal water treatments. Furthermore, this work highlights the potential impact of TNMW transfer and subsequent storage on its hydrogenome.

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