Development, metabolite profile, and sensory qualities of water kefirs with sucrose and non-sucrose sweeteners

Dzmitry Paturemski

Ph.D. Saska Tuomasjukka[1,2], D.Sc. (Tech.) Niina Kelanne[1], Ph.D. Doc. Oskar Laaksonen[1]

[1] Food Sciences Unit, Department of Life Technologies, University of Turku, Turku, Finland [2] Lapin Maria Oy, Finland

Introduction

Water kefir is a fermented beverage based on sugared water or juices that might have potential health benefits associated with its microbial content. However, water kefir microbiota, if kept alive, continues to metabolise sucrose during storage, potentially affecting the sensory qualities of the drink over time. Non-fermentable sweeteners might be a suitable solution, but they might affect the range of metabolites synthesised during fermentation [1] [2].

Aim

To develop water kefir recipes by substituting part of sucrose with other sweeteners and to discover whether sweetener substitution causes changes in the metabolite profile and sensory qualities of the product.

Materials and methods

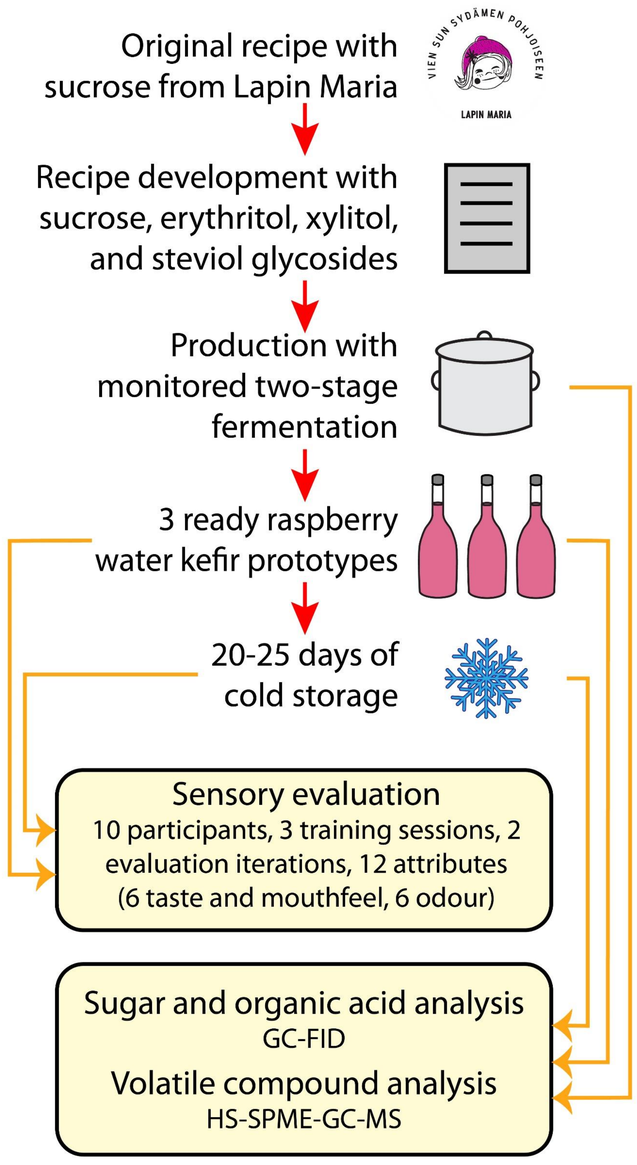
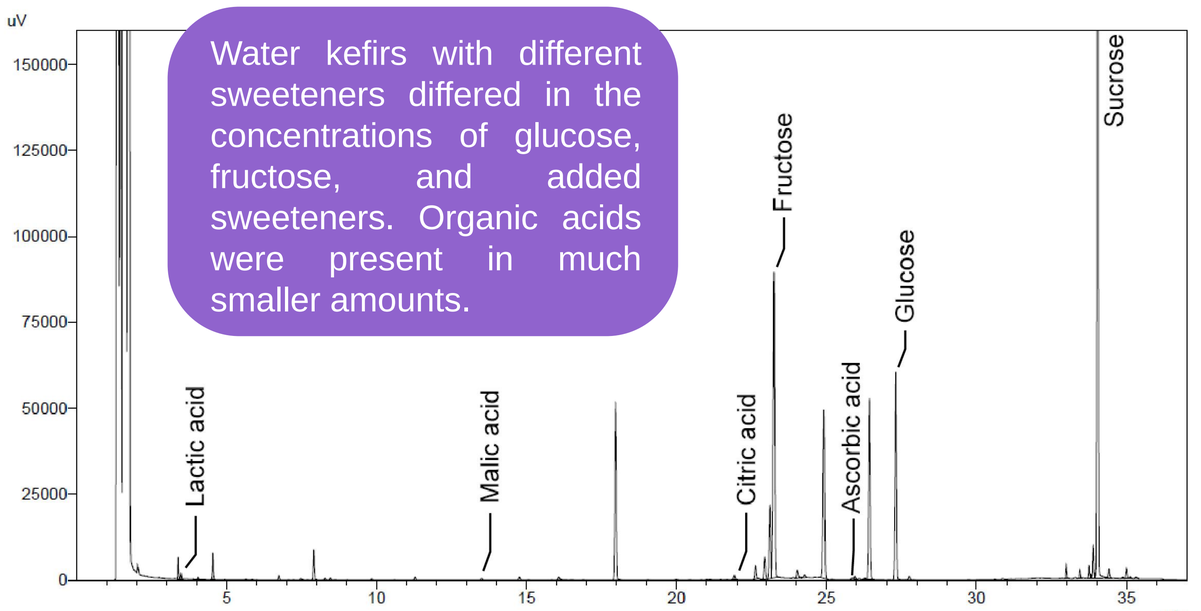


Figure 1. Flowchart of the study design

Volatile profile analysis, organic acid and sugar analysis were performed in biological triplicates. Volatile profile analysis was performed in technical triplicates; organic acid and sugar analysis – in technical duplicates.

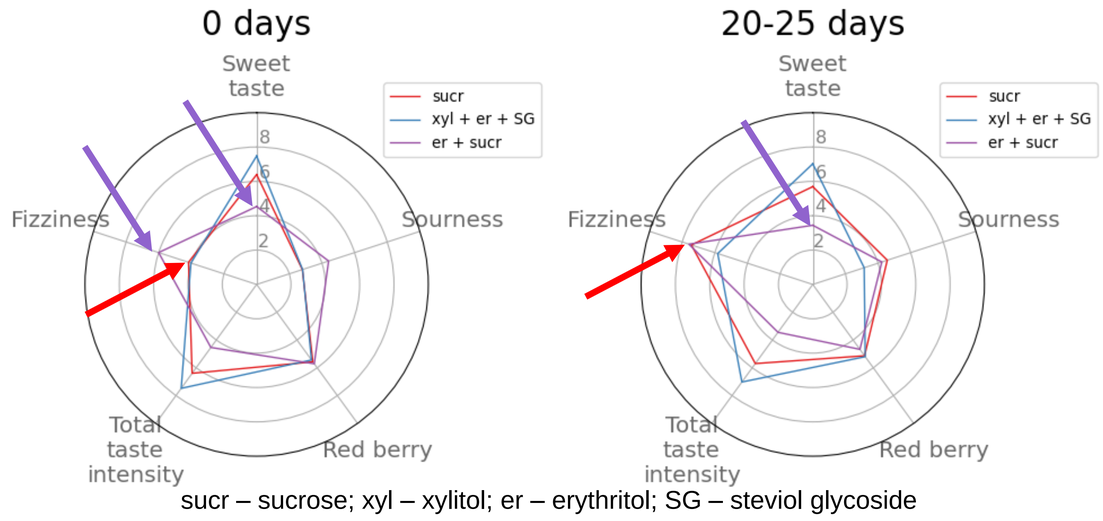
Results and discussion



Water kefirs with different sweeteners differed in the concentrations of glucose, fructose, and added sweeteners. Organic acids were present in much smaller amounts.

Figure 2. Gas chromatogram (GC-FID) of water kefir with sucrose, 0 days after production

Three recipes showed slight variation in their volatile profile. On the sensory level, water kefir with erythritol and lowered amount of sucrose was perceived as less sweet and more carbonated than other recipes before and after cold storage and as less sweet after cold storage. In addition, water kefir with sucrose was significantly more carbonated after cold storage. The products did not differ significantly in other tastes or odours.



sucr – sucrose; xyl – xylitol; er – erythritol; SG – steviol glycoside

Figure 3. Perceived taste of water kefirs with different sweeteners before cold storage and after 20-25 days

Conclusions

Introduction of non-fermentable sweeteners can cause changes in the sensory qualities of water kefir that are directly linked to their concentrations. While there is a slight variation in volatile compound levels, the recipes do not differ in odours or tastes that could be attributed to water kefir metabolites. Development of water kefirs with non-sucrose sweeteners has a potential, and further research could focus on product acceptance and direct measurement of carbonation.

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References

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