Development of goji berries in brewing: comparisons between analytical data and sensory.

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Introduction

Beer is a drink consumed around the world. It is a product rich in carbohydrates, amino acids, minerals, vitamins and phenolic compounds. The addition of red fruit helps bring new flavours and also increases the bioactive components and oxidative stability of the products. It is also recognized that moderate beer consumption can have a positive impact on health by reducing the risk of cardiovascular diseases. In addition, Goji berries (*Lycium barbarum*) are recognized in traditional Chinese medicine for their therapeutic virtues. Their high content of polysaccharides, carotenoids, polyphenols, amino acids resulted in their perception as "super fruit". The QualFood project, funded by the healthfood program HES-SO, aimed at elaborating modes of integration of Goji berries in the diet in order to promote their consumption. To answer this aim, the beers were enriched with goji berries by adding the latters at different production stages. The sensory and analytical quality of the obtained beers were evaluated. Finally, a comparison between the analytical and sensory results was performed.

Materials & Methods

✓ Beers were brewed based on the recipe for amber ale beer
✓ Several addition of goji berries were done at different times of brewing

✓ Physicochemical analyses were conducted:
Standard analysis - Total Polyphenols Content (TPC) - Trolox Equivalent Antioxidant Capacity (TEAC) - Oxygen Radical Absorbance Capacity (ORAC) - Content of phenolic compounds by HPLC

✓ Sensory analyses were realized: Free sorting task to describe the beers - Quantitative Descriptive Analysis (QDA) to evaluate the intensity of each attribute - Consumer test with 85 participants give the appreciation of each beer
✓ Statistical analysis: for the physicochemical analysis, one way ANOVA and Tukey test – for the Free sorting task, a Multidimensional Scaling (MDS) – for the QDA, ANOVA to determine the difference between the beers on each attribute and a PCA to represent the samples – for the consumer test, one way ANOVA and Tukey test – For the relationship between analytical and QDA analysis, Multiple Factor Analysis (MFA) and RV coefficient.
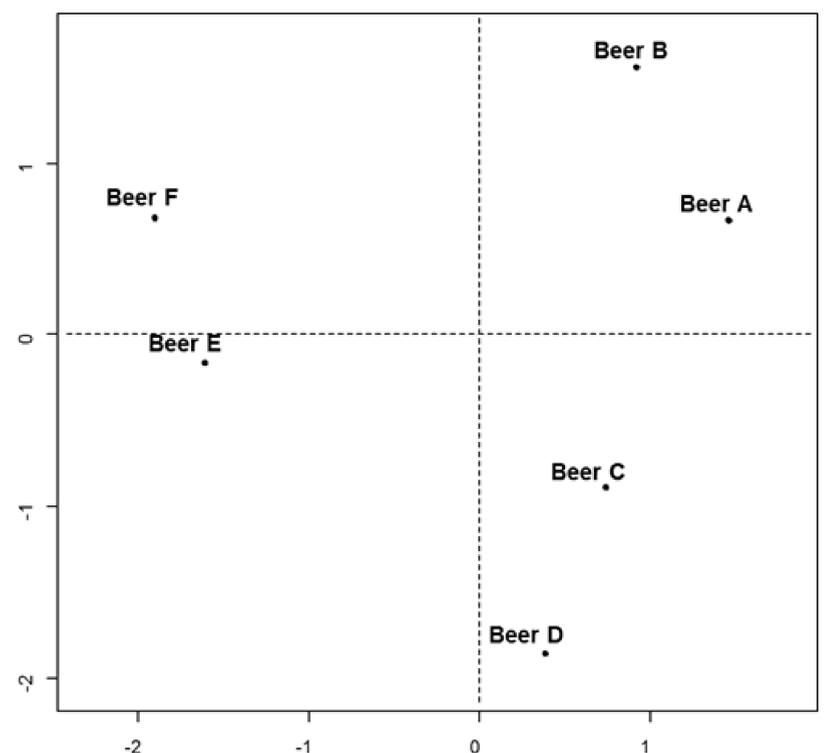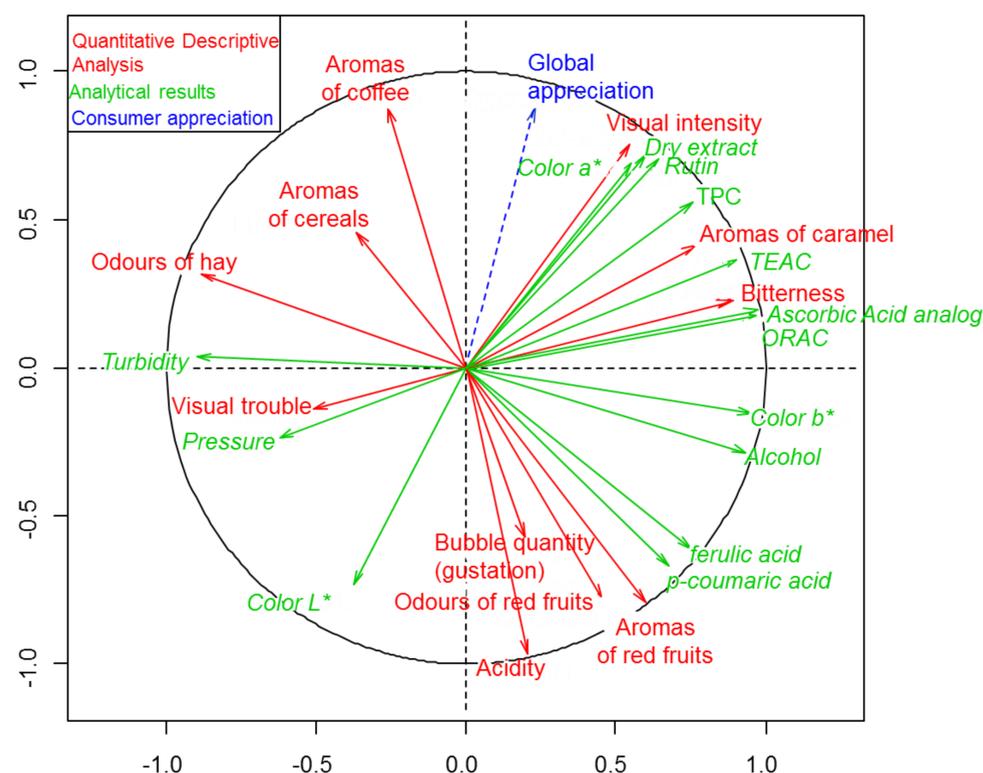
Results:

✓ The relationship between the sensory and analytic data was investigated using MFA. The red coloured descriptors represent the significance of the QDA at 5% (ANOVA), the analytical data are green coloured and the global consumer appreciation (blue coloured) is projected as illustrative variable.

✓ Consumer test showed significant differences of appreciation between the beers (test of ANOVA with significant product effect (F (5,420) =9.86, p-value < 0.001)). The consumer preference is therefore clearly towards the treatments which goji berries added at the beginning of the production process.

Where are the "Perspectives" below?

✓ The multidimensional correlation between the sensory data of the profile and the analytic parameters is significantly positive (RV = 0.68, p-value < 0.10). Therefore, the sensory data and the analytical parameters are positively correlated, which confirms the results of previous studies. The present study showed that a certain temperature at the beginning of the process allowed a better extraction of polysaccharides and antioxidants [1, 2].
✓ Taking into consideration the results of all analysis, it can be concluded that the addition of goji berries at the beginning of wort boiling allows preserving/extracting bioactives and obtaining the beer with high antioxidant activity and best sensorial characteristics.

Acknowledgments

References:

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[2] Yang, R.; Zhao, C.; Chen, X.; Chan, S.; Wu, (2015) J. Chemical properties and bioactivities of Goji (Lycium barbarum) polysaccharides extracted by different methods. J. Funct. Foods, 17, 903–909.