

Sensory analysis of beer with different flavors

Crina Muresan, Anamaria Pop^{*}, Sevastița Muste, Sonia Socaci, Stancuta Scrob,
Cristian Baraian

¹ University of Agricultural Sciences and Veterinary Medicine, Faculty of Food Science and Technology,
3-5 Mănăștur street, 3400, Cluj-Napoca, Romania

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Abstract

The beer type can be defined by the raw materials used in production, the manner in which the process is conducted, the type of used fermentation, the way the entire product is conditioned and by packaging. The aim of the research was to analyze the flavor profile of beer samples with different flavors by sensory analysis. The method consists in evaluating flavor profile semi quantitative overall smell and taste samples with the four basic tastes: sourness, bitterness, sweetness and saltiness.

Keywords: beer, flavor profile, sensory analysis, consumer preferences.

1. Introduction

In particular between any of the beers category beer that is produced by a method which is an ingredient or outside the conventional method beer with added fruit, herbs, spices, in particular if the ingredient is a key component to change the characteristics of beer, also make additions to or changes in the brewing process in the case of fermentation, maturation, filtration in terms of the physical parameters. [2,6].

The ingredients used in the manufacture of the special beers are fruits that can be of different varieties and varieties, taking into account the taste and aroma wishing to obtain the beer and the concentration of sugars that add.

An important decision in the manufacturing process is that the form of adding fruit: fresh or dried fruit, fruit puree, fruit juice, natural fruit extracts or artificial extracts. In general, the bitter fruits (cherries bitter orange peel) usually give a stronger flavor, while fresh fruit (blueberries, strawberries raspberries) give more taste beer [5,6].

Generally beer contains numerous aromatic compounds, some naturally present in the raw materials and some formed during processing [3,4]. Flavor perceptions are a complicated mix of all of these factors. Some of these flavors are derived from raw materials (malt, adjuncts, hops, and water), but the vast majority are formed by yeast during fermentation [1]. Adding fruit in different forms change the perception of flavor beer.

The aim of this work was to make the flavor profile of beer flavored samples. Samples were chosen after a market study on consumer preferences regarding different beer flavors.

2. Materials and methods

Samples: The samples analyzed were purchased from supermarkets in Cluj-Napoca and were selected based on consumer preferences.

The market study was conducted online, on a number of 150 subjects. Choosing products for the study were chosen based on the following criteria: are the best known, most consumed most popular (easy to find in supermarkets, bars).

Samples preferred by consumers and studied for flavor profiling were coded as follows, beer with lemon: CNR, RL, BL, BFL, BAVL, UC and beer with cranberries RC.

As composite samples have low alcohol content 2-4%, and the beer content ranges between 37-90%

Method: The method consists in evaluating flavor profile semi quantitative overall smell and taste samples with the four basic tastes: sourness, bitterness, sweetness, and saltiness.

Sensory analysis by this method contains a description of the nuances of taste and smell after their intensity after amplitude or global impression of smell and taste, assessed according to the following scale: not detectable (0), slightly detectable-limit (0.5), weak (1), medium (2), strong (3).

We used a number 10 team qualified tasters, trained specifically for this method. Was made for the beginning of smell and taste profile of standard samples. It was established terminology, the order of occurrence and intensity of individual nuances. Then each sample was independently evaluated in the following order: smell, taste, and aftertaste. Conclusions each team member were discussed jointly.

3.Results and Discussion

The results are presented in diagrams Spider, Fig 1-16 depending on the characteristics specified in the method of determining the flavor profile.

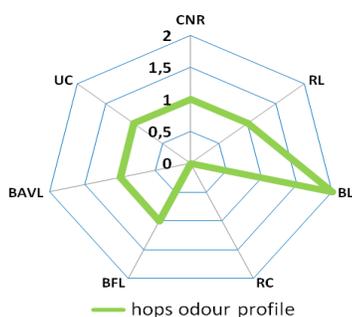


Figure 1

Regarding the hops odour profile (fig.1) that beer has an aroma hop RC medium (2), the opposite is odorless BFL hop beer; remaining samples had a smell of hops less noticeable. Due to the

composition of the samples studied was not noticed the strong smell of hops (beer content was between 37-90%).

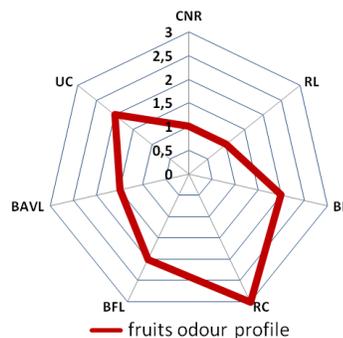


Figure 2

As shown in figure 2 with RC has obtained the highest value for the odour of fruit; the opposite is CNR and RL which have the lowest value.

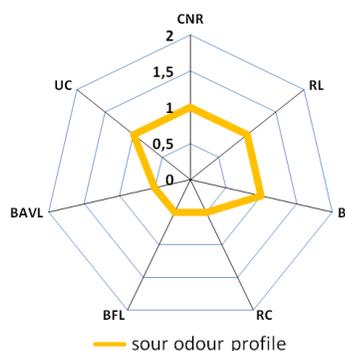


Figure 3

Sour odour is less noticeable, as shown in the diagram; RC, BL, BFL is borderline, while CNR, RL, UC is poorly discernible.

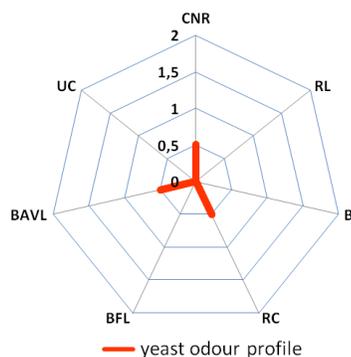


Figure 4

Yeast odour is less noticeable in beers: BL, RC and CNR. While the other hasn't noticed the smell of yeast.

In terms the CO₂ taste of profile, taste CO₂ was receiving a medium intensity all beers.

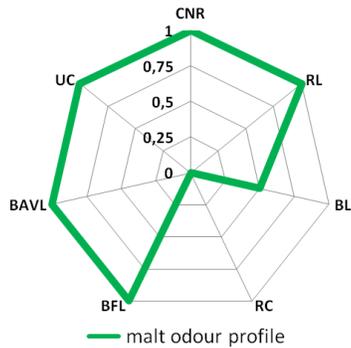


Figure 5

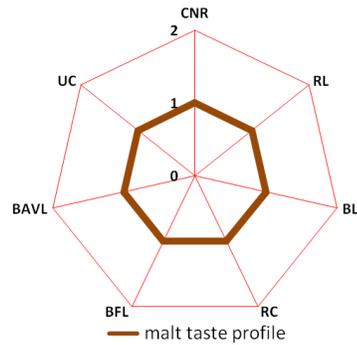


Figure 8

The odour of malt was not felt at all the beer RC at BL odour of malt was the limit, and the other less felt.

Regarding malt taste profile was weakly felt in all beers.

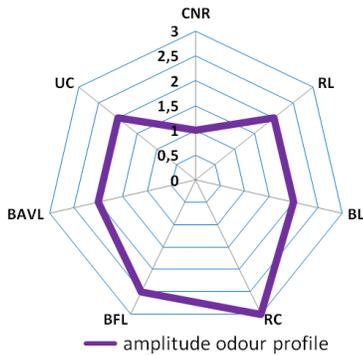


Figure 6

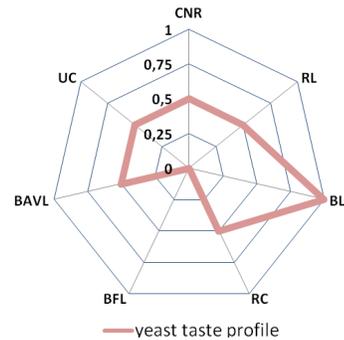


Figure 9

In figure 6 is shown the amplitude of odour, the lowest value has CNR, the opposite is RC, cranberry beer.

In Figure 9 is presented yeast taste profile. The sample BFL beer was not felt this taste, the taste test was notified yeast BL weak, and for the other samples examined was felt yeast taste to the limit.

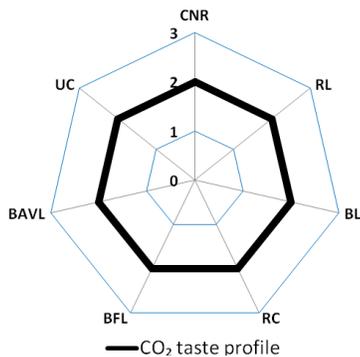


Figure 7

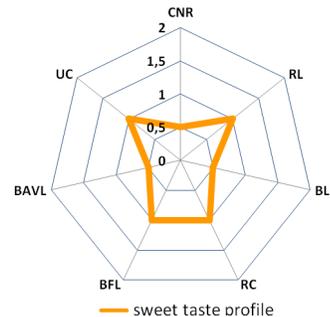


Figure 10

Weak sweet taste was noticed in all samples, except CNR, BL and BAVL this taste felt to the limit (fig 10).

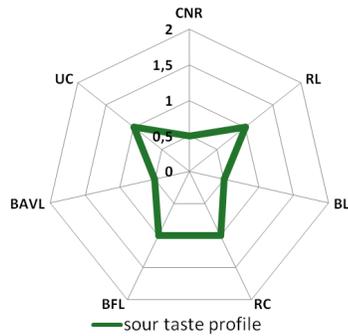


Figure 11

In figure 11 is presented sour taste profile. Profile is similar to the profile of sweetness.

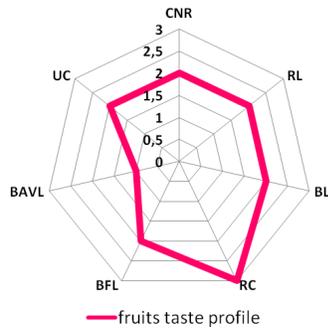


Figure 12

Fruit taste was felt strongly in beer RC and low value recorded a BAVL. We can say that cranberry taste was felt stronger than lemon.

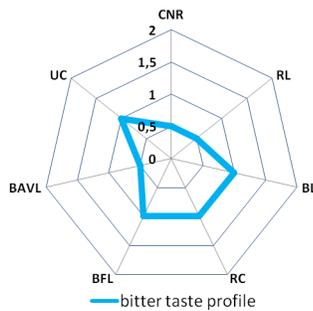


Figure 13

The bitterness felt the evidence was weak beer UC, BL, RC, BFL. The other sample was felt bitter taste to the limit Figure 13.

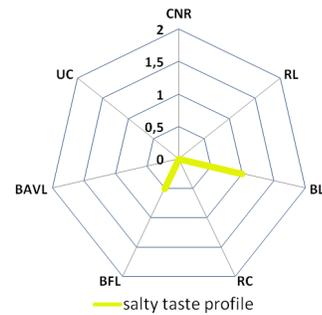


Figure 14

Salty taste is only slightly felt there was beer BL, the slightly detectable for BFL and was not present at rest samples.

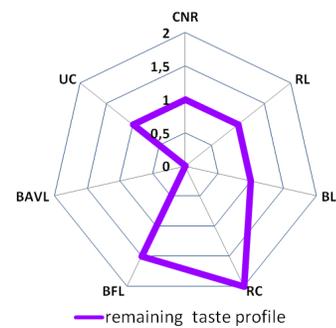


Figure 15

Aftertaste of fruit was felt in all the samples studied, less the BAVL. RC beer sample which has had an aftertaste intensity higher than the other samples. The aftertaste can be a consequence of this flavor of alcohols derived from hops [1].

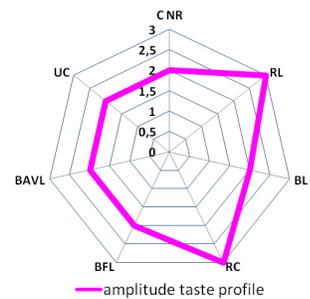


Figure 16

In figure 16 is shown the amplitude taste. The amplitude of the strongest recorded a beer with cranberry RC and RL of beers with lemon. The other had a moderate RC and RL have the highest alcohol concentrations of samples (4%).

4. Conclusion

As a result of the flavor profile we conclude that the samples have the following characteristics preferred by consumers:

- the odour of hops and malt is weak and fruit smell is strong (overpowering), explainable because the samples composition (content of beer varies from 37 to 90%)
- CO₂ taste is medium, and the malt to the limit;
- sweet and sour taste was weak but felt in all samples;
- global impression of taste and smell (amplitude) is average except RC and RL samples that have a high amplitude taste.

These tests are used in sensory analysis of beer industry, sensory analyst must be able to identify the flavors of beer and provide corrective feedback to the brewer.

Although they are controversial, because they contain additives, these products are gaining ground among consumers, with low alcohol content and due to consumer curiosity. Not least by the addition of fruit juice consumers understand extra vitamins, minerals and antioxidants beneficial to health.

Compliance with Ethics Requirements. Authors declare that they respect the journal's ethics requirements. Authors declare that they have no conflict of interest and all procedures involving human / or animal subjects (if exist) respect the specific regulation and standards.

References

1. Bickham, Scott. An Introduction to Sensory Analysis. *Brewing Techniques*, **1997**, 38, 149
2. Bamforth, C.W., Nutritional aspects of beer: a review. *Nutr Res* **2004**, 22(1-2), 227-37, [doi:10.1016/S0271-5317\(01\)00360-8](https://doi.org/10.1016/S0271-5317(01)00360-8)
3. Mudura Elena, Maria Tofana, Sevastita Muste, Adriana Paucean, Sonia Socaci, The evaluation of hop utilisation in brewing process, *Journal of Agroalimentary Processes and Technologies*, **2009**, 15(2), 249-252.
4. Michiu Delia, Maria Tofana, Elena Mudura, Florina Muntean, Preliminary Research Concerning the Determination of Beer Wort Flavor Compounds During Primary Fermentation, *Bulletin UASVM Agriculture*, **2010**, 67(2), 309-313.
5. Mirela Calu, Denisa Duta, Elena Pruteanu, Maricica Stoica, Electronic Nose and sensorial characterization-discrimination for seven apple types stored, 7 months, in refrigeration and controlled atmosphere conditions *Journal of Agroalimentary Processes and Technologies*, **2010**, 16(3), 376-381
6. Camelia Bonciu, Comparison between Two Fermentation Methods for the Obtaining of Beer with Strawberries Antoneta Stoicescu, *Journal of Agroalimentary Processes and Technologies*, **2008**, 14,183-189