

Consumer preference and sensory characteristics of Japanese beers

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Introduction

With the launch of a new genre of product called “Happoshu (low-malt beer)” on the market in 1994, beer companies came to put various beers on the market. These products have been widely accepted by Japanese consumers and the market share of Happoshu and non-malt beer-tasting beverages, due to their cheaper price, for domestic consumption is now bigger than that of regular beer. It seems that consumers who always drink them tend to choose the brand for economic reasons, not as a preference. But we think that some people are sure to be choosing the brand by their preference. To verify this, we researched their preferences and sensory properties of various beers and non-malt beer-tasting beverages. First, we evaluated 16 commercial Japanese beers and beer-tasting beverages using quantitative descriptive sensory analysis. Then we screened 110 consumers who usually drank one particular brand of non-malt beer-tasting beverage as tasters and evaluated their overall preferences for 16 commercial Japanese beers and beer-tasting beverages.

Materials & Methods

Table 1. 16 Samples classified with malt ratio

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
regular beer	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Happoshu (low-malt beer)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
non-malt beer-tasting beverage	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1. Quantitative descriptive sensory analysis

Samples are listed in Table 1.

The panel consisted of seven well-trained members.

Prior to the quantitative descriptive analysis, seven panelists had thoroughly discussed sensory properties of samples until all of them had agreed to use them as the attributes.

A 60-ml sample was placed in a 160-ml transparent PET cup covered with a PET cap.

Samples were randomly presented to each panel with a three-digit random number.

Each attribute was evaluated using a line scale.

2. Consumer Test (sequential monadic test)

Samples were the same as for the quantitative descriptive sensory analysis.

The panel consisted of 110 consumers who usually drank **sample 13**.

A 60-ml sample was placed in a 160-ml transparent PET cup covered with a PET cap.

Samples were randomly presented to each panelist with a three-digit random number.

Each consumer evaluated their preference for each sample using a seven-point hedonic scale, where 1 = dislike a lot and 7 = like a lot.

Result

1. Quantitative descriptive sensory analysis

Table 2 Thirty-one attributes for sensory analysis

	Numbers	Sign
aroma	14	a1 ~ a14
taste	5	b1 ~ b5
flavor	6	c1 ~ c6
mouth-feel	2	d1, d2
aftertaste	4	e1 ~ e4

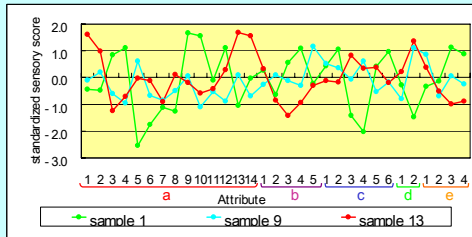


Fig. 1 Comparison of sensory profiles composed of average scores for 31 attributes

2. Consumer Test

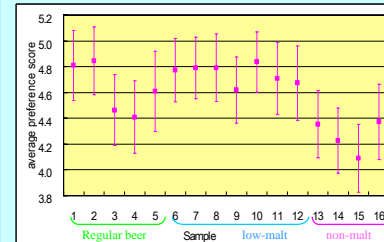


Fig. 4 Comparison of average preference scores for 16 samples

Consumers showed a range of preferences for beers and beer-tasting beverages. Scores for beer-tasting beverages were relatively low.

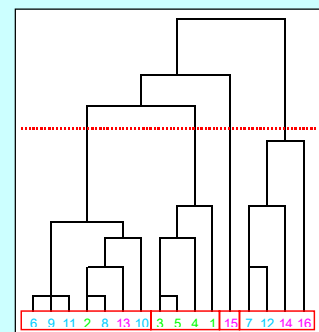


Fig. 2 Cluster analysis of average sensory scores for 16 samples

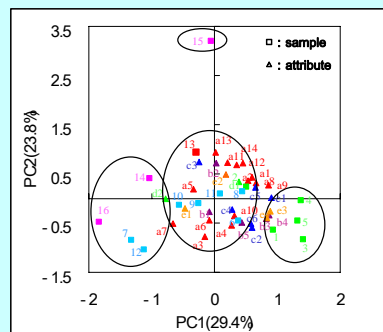


Fig. 3 Factor loadings and principal component scores extracted from sensory data

By the cluster analysis, samples were classified into four categories. It seems that the malt ratio had a large influence on the classification. Sample 15 had a unique character and was put in a category of its own.

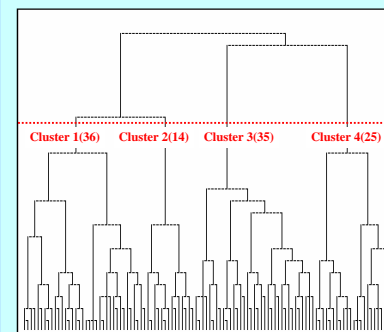


Fig. 5 Cluster analysis of average preference scores for 110 consumers

Table 3 Comparison of average preference scores for four clusters

samples	Cluster(numbers)				average
	1(36)	2(14)	3(35)	4(25)	
1	4.7	4.4	5.0	5.0	4.8
2	5.5	5.6	4.3	4.2	4.9
3	3.8	5.4	4.1	5.4	4.5
4	4.5	5.1	3.9	4.7	4.4
5	4.2	5.6	4.5	4.8	4.6
6	4.9	4.9	4.3	5.2	4.8
7	5.3	4.8	4.7	4.2	4.8
8	5.0	4.9	4.8	4.4	4.8
9	5.0	4.1	4.2	4.9	4.6
10	4.8	4.8	4.5	5.4	4.8
11	5.1	5.4	4.4	4.2	4.7
12	5.1	5.6	4.9	3.2	4.7
13	4.5	4.6	4.5	3.7	4.4
14	3.7	4.4	4.4	4.6	4.2
15	3.4	3.7	5.3	3.6	4.1
16	3.5	5.7	4.8	4.3	4.4
average	4.6	4.9	4.5	4.5	4.6

110 consumers were classified into four categories by their preference scores for 16 samples.

3. Preference Map

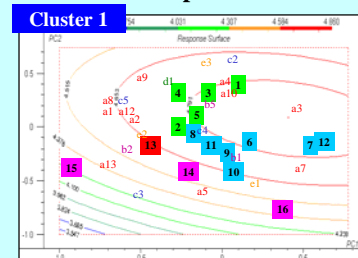


Fig. 6 Preference map of cluster 1

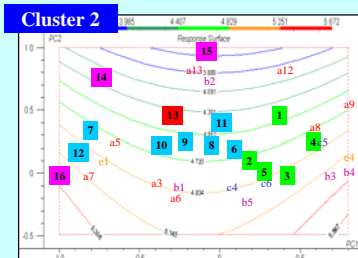


Fig. 7 Preference map of cluster 2

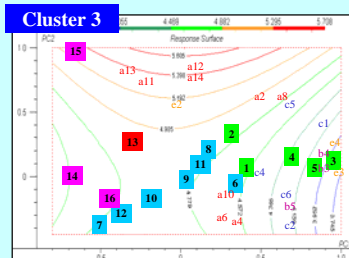


Fig. 8 Preference map of cluster 3

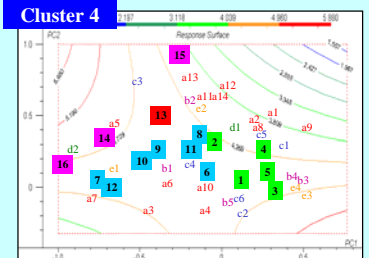


Fig. 9 Preference map of cluster 4

We created preference maps combining sensory scores with consumers' preferences for each cluster. Each cluster had a different feature in their preference. For example, consumers in cluster 3 showed a distinct preference for sample 15. Sample 15 had some notable scores in aroma attributes (a11 and a13). On the other hand, they disliked regular beers for their tastes and after-taste attributes (b3, b4, e3 and e4).

Conclusion

The 110 consumers, who usually drink one particular brand, were grouped into four clusters due to their preferences for beers and beer-tasting beverages. Each cluster showed a distinct characteristic as indicated in Fig. 6-9. It was suggested that some consumers tend to drink the particular brand because of their preferences. But not all the consumers prefer their usual brand, when presented with the brand names undisclosed.