



Determination of Quality Attributes Driving Consumer Acceptance for Cold Hardy Grape Wines Produced in Quebec

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Abstract

In order to evaluate quality attributes driving consumer acceptance for wines produced in Quebec, 24 wines, including 21 wines from Quebec and 3 wines from northern France and Italy, were evaluated by a panel of 59 average consumers on a 9-points hedonic scale, from "faulty" to "excellent", and submitted to an expert panel for descriptive analyses. Wines average scores ranged from 3.9 to 5.6 ("medium bad" to "medium good"). No correlations were found between scores and socio-demographic data, suggesting that wine appreciation was not related to consumer personal characteristics. Concordance analysis of the descriptive analyses showed significant Kendall's coefficient for 10 out of 24 descriptors. Principal component analysis showed that highly rated wines were characterized by higher sweetness, along with toasted, spices and caramel notes.

Introduction

In Quebec, the government-owned Société des Alcools du Québec (SAQ) controls wine imports and sales throughout the province, providing local market with one of the largest product range in America. Such an availability of world wines contributes to the development of Quebec's palate for high quality products, but makes it difficult for the relatively new local wine industry to break through Quebec's market, especially because Quebec wines are still regarded as low quality products by many Quebecers. In order to evaluate quality markers for wines produced in Quebec, 24 wines, including 21 wines from Quebec and 3 wines from northern France and Italy, were evaluated by a panel of 59 average consumers, on a 9-points hedonic scale. Then, descriptive analyses were conducted by an expert panel, constituted of sommeliers, wine writers and wine enthusiasts.

Experimental

Wines: 24 commercially available wines (21 from Québec and 3 from Europe) were included in the sample set.

Chemical analyses: pH and titratable acidity (g·L⁻¹ tartaric ac. eq.) were measured according to the methodologies described by Amerine & Ough (1980).

Hedonic analyses: Tastings were conducted in a sensory room, under red light, in individual boxes. 59 untrained panelists (31 women, 28 men, 20 to 66 year old) attempted three sessions held on three different days, according to an incomplete block design. Panelists were asked to rate each sample according to their own taste, on a 9-points hedonic scale, from "faulty" to "excellent", and to fill a socio-demographic and wine related questionnaire.

Descriptive analyses: Analyses were conducted by an expert panel (3 women, 5 men). Pre-tasting sessions were conducted to first select suitable descriptors for the sample set, using the Wine Aroma Wheel (Noble *et al.*, 1987), then, to

evaluate reference standards and confirm descriptors list. Analyses were conducted during two sessions (incomplete block design). Wine samples (50 mL) were served using three digit randomized numbers and presented in a randomized order. Panelists were asked to rate each descriptor from "0" (none) to "4" (extremely intense).

Statistical analyses: Analysis of variance and principal component analysis were achieved using the Mix and the Princomp procedures of SAS, respectively (SAS Institute, Cary, North Carolina). Scores were evaluated for significant differences among socio-demographic data using boxplot analysis. Concordance analysis for the expert panel was achieved using the Magree macro for Kappa agreement (SAS Institute, Cary, North Carolina). Descriptors showing significant Kendall's coefficients and/or a frequency higher than 50% among samples, were included in the Principal component analysis.

Results

Table 1. Wine's characteristics and hedonic analysis scores over a 9-point scale, from 1 "faulty" to 9 "excellent" (n=59).

Wine ID	Origin	Grape varieties	Score
275	Quebec	Marechal Foch, Lucy Khulman, De Chaunac	5.62 a ¹
850	Quebec	Pinot noir, Marechal Foch	5.32 ab
935	Quebec	Marechal Foch, Baco noir, De Chaunac	5.40 ab
360	Italy	Corvina veronese, Rondinella, Molinara	5.18 abc
547	Quebec	Frontenac, Sabrevois	5.2 abc
689	Quebec	Marechal Foch	5.19 abc
995	Quebec	Frontenac and 4 others	5.21 abc
299	Quebec	Frontenac	4.94 bcd
157	Quebec	Marquette	4.76 bcde
620	France	Pinot noir	4.78 bcde
724	Quebec	Baco noir	4.76 bcde
246	Quebec	Frontenac rouge, St.Croix	4.59 cdef
465	Quebec	Sabrevois	4.52 defg
432	Quebec	Maréchal Foch and 5 others	4.37 defgh
543	Quebec	Maréchal Foch, Ste-Croix et Frontenac	4.37 defgh
978	Quebec	Frontenac, Marquette	4.37 defgh
165	Quebec	Chancellor, Frontenac	4.27 efgh
245	Quebec	Sabrevois and 4 others	4.15 efgh
287	Quebec	Frontenac	4.29 efgh
539	France	Gamay	4.23 efgh
446	Quebec	De Chaunac	4.08 fgh
643	Quebec	Sabrevois, Frontenac	4.00 fgh
635	Quebec	Chancellor, Frontenac	3.93 gh
576	Quebec	Chancellor	3.85 h

¹ Samples on different lines with different letters are significantly different from each other at P ≤ 0.05.

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References

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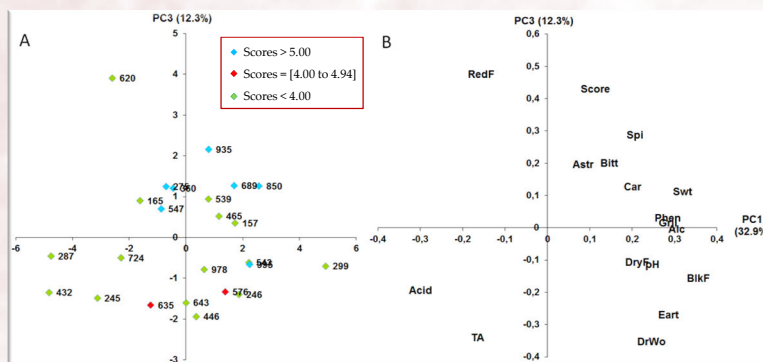


Figure 1. Principal component analysis of titratable acidity, pH, and sensory characteristics (hedonic and descriptive analyses) of wine samples (A) and variables (B). Randomized three digit numbers refers to wines listed in Table 1. Variables: Score, pH, titratable acidity (TA), red fruit (RedF), black fruit (BlkF), dry fruit (DryF), dry wood (DrWo), phenolic/vanilla (Phen), grilled bread (Gril), earthy (Earth), spices (Spi), caramel (Car), sweetness (Swt), acidity (Acid), bitterness (Bitt), astringency (Astr), alcohol burnt (Alc).

Conclusion

- Wines average scores from the consumer panel (hedonic analysis) ranged from 3.9 to 5.6 ("medium bad" to "medium good"), with seven wines scoring over 5 and two wines scoring lower than 4.
- Mainstream European wines (ID 360, 620, 539), known as major sailing products in SAQ, did not score higher than hybrid wines produced in Quebec.
- No correlations were found between scores and socio-demographic data, suggesting that wine appreciation was not related to consumer personal characteristics.
- Principal component analysis indicated that highly rated wines were characterized by lower TA, higher sweetness, along with toasted, spices and caramel notes.
- While off-flavors such as earthy notes, and higher acidity were associated with lower scores wines, no clear quality makers could be attributed, in part because differences found between samples, though significant, were fairly small, and because difference in wine styles among the sample set affected the results.
- Regarding grape varieties, best scored wines often included French hybrids such as Maréchal Foch.