

# Using Exposure to test New Product Acceptability: The Case of Low-Alcohol Wine

**Josselin MASSON**

Doctoral candidate

Montpellier SupAgro, UMR MOISA, CR2M

2 place Viala, Bldg. 26

34 060 Montpellier Cedex 1, France

Tel.: [33] (0)4 99 61 24 79

E-mail: [massonj@supagro.inra.fr](mailto:massonj@supagro.inra.fr)

**Philippe AURIER**

Professor

University of Montpellier II, C2RM

Place Eugene Bataillon

34 095 Montpellier Cedex 5, France

Tel.: [33] (0)4 67 14 46 45

E-mail: [philippe.aurier@wanadoo.fr](mailto:philippe.aurier@wanadoo.fr)

**Francois D'HAUTEVILLE**

Professor

Montpellier SupAgro

2 Place Viala, Bldg. 26

34 060 Montpellier Cedex 1, France

Tel.: [33] (0)4 99 61 23 18

E-mail: [hauteville@supagro.inra.fr](mailto:hauteville@supagro.inra.fr)

# Measuring Acceptability of a New Product Through Consumers' Prolonged Exposure: The Case of Low-Alcohol Wine

## **Abstract:**

This paper addresses the potential of fostering the sensory and psychological acceptability of a product which has been significantly altered. In the case of low-alcohol red wine, we conducted a longitudinal study of consumption in the home, allowing us to measure both the quantities consumed and the hedonic evaluations before and after exposure to the product. During the first phase, 24 consumers were divided into two separate groups, and, over a two week period, were given wine containing a reduced alcohol content of 9%, as well as a “standard” wine containing 12.5% alcohol. During the second phase, 40 consumers were given a wine containing 12% alcohol but with a label indicating 10.5% or 13.5% alcohol, according to the same alternate protocol. The results of the first blind testing suggest a good sensory acceptability of the reduced alcohol wine which persisted after the trial of the two products. The second phase, with information provided, indicated an equivalent psychological acceptability of the supposedly “weak” alcohol level and the supposedly “strong” alcohol level because the quantities of the products consumed were equal regardless of the information accompanying the products. This result is inconsistent with previous studies comparing the acceptability of wines containing varying degrees of alcohol. Although the size of the sample made it difficult to obtain significant results, our result suggest that, while prolonged exposure have not changed usual behaviours, it seem to have a (positive) effect on expectations towards the innovation.

**Key words:** exposure, new product, consumer, wine.

## **Using Exposure to test New Product Acceptability: The Case of Low-Alcohol Wine**

### **Introduction**

This research is part of an attempt to respond to a request from the French wine sector who wishes to diversify its products to reach new markets. At present, the steady decline in the number of regular wine drinkers (Laporte 2007), growing competition from the emergence of new wine and other beverage-producing countries (Aurier 2007), and health and public safety concerns are creating difficulties for the profession. As wines become more and more alcoholized (due to the search for quality, global warming, etc.), the development of a low-alcohol wine could respond to these objectives: reintroduce wine to the table during daily meals with an easier-to-drink wine, thus reducing the harmful effects of alcohol; and introduce new consumers to a more accessible wine to commence their experience of learning about wine.

On a theoretical level, it comes back to the acceptance of a product which has undergone a change in one of its basic characteristics, the level of alcohol in wine. Indeed, this change risks devaluing the product, even removing it from its reference category, if this characteristic is considered integral to its perceived quality. On-going research on attributes determining the choice of wine suggest that the French consider the alcohol level relatively unimportant, in comparison to colour, suitability with particular dishes, brand, region, a friend's advice, etc. (Cohen et al., 2008). However, as is often the case, the alcohol level is not specified in this study, and one may assume that, within the recognized limits of the wine category, the criterion of alcoholic content does not affect the choice. In a recent study of 73 French consumers (Masson et al., 2007), the acceptable range of alcohol content was between 10.5% and 13% for a red wine. This range is also quite a good reflection of wines currently on the market, which leads to the assumption that expectations about alcoholic content are related to patterns of consumption. Departing from this range of 10.5% - 13% alcoholic content would then lead consumers to reconsider their preference, to the extent that this is related to their habits and their perception of available wines.

Our objective is to determine whether prolonged exposure of consumers to a product whose characteristics are out of the ordinary may bring about a modification in preferences and, thus, an acceptance of the modified product. This study also allows us to verify experimentally whether the two extremes of the range 10.5% - 13% alcoholic content affect these preferences. The experimental protocol chosen is original, in employing the notion of repeated exposure through a longitudinal study of respondents' consumption at home.

This research is part of a trend in the literature that focuses on food preferences by examining the role of products' sensory attributes and the information that accompanies products (Anderson, 1973, Deliza and MacFie, 1996, Lange et al., 2002, Tuorila et al., 1994, and Fornerino et al., 2006). In our situation, the acceptance of a partially de-alcoholized wine bears on both taste and information relative to low-alcohol content. Due to these wines' lack of alcohol, certain consumers may perceive their taste as unusual compared to "standard" wines. The same is true for information on the lower alcohol level which may be perceived negatively (Masson et al., 2007). This study's objectives are, consequently, to learn about consumers' reactions to both the taste of low-alcohol wine and to nonsensory information on the "reduced alcohol content," and to verify whether prolonged exposure to these two types of sensory and nonsensory stimuli is likely to influence this new product's acceptability.

Another original aspect of this research is the ability to assess the evolution of acceptability, not only based on successive hedonic evaluations in the course of the experimentation, but also according to real quantities consumed in the course of the experiment.

We commence by presenting our theoretical position, then we develop the methodology used, and finally we finish with a presentation and critical discussion of the results.

## Theoretical position

Marketing research on individuals' adoption of new products usually uses instantaneous attitudinal measures of preference or purchase intention (Migdley and Dowling, 1978, Roehrich, 1987, and d'Hauteville, 1994). Measures bearing on individuals' innovative character focus on consumer interest and propensity to buy new products and are validated by the actual selection of new products over others (Goldsmith, 1992).

Therefore, what is measured is the probability of making a first trial purchase rather than the adoption of a new product over the long term. Consumers, motivated by the search for variety or by simple curiosity, may buy a product once without, however, repeating the purchase or changing their habits and displaying a lasting preference for the product. Research (Cordelle et al. 2004; Cordelle et al. 2005; and Lévy and Köster 1999) has shown that more than 30% of subjects changed their preference over time. Köster et al. (2003) revealed that the initial hedonic impression is a weak indicator of final preference and choice. Consequently, it seems important to design an experimental situation of exposure with repeated measurements in order to draw conclusions about the lasting acceptability of a product.

Furthermore, being confronted with a product on a continuous basis may encourage consumers to develop a sense of familiarity with the product and may foster a preference (Pliner 1982; Porcherot and Issanchou 1998; Stang 1975; and Zajonc and Markus 1982). With repeated exposure, preferences may either increase due to the effect of simple exposure (Zajonc 1968), or diminish through the appearance of boredom or monotony (Siegel and Pilgrim 1958). Thus, repeated exposure of the consumer to the new product should create a process of learning and habituation, likely to modify preferences and lead to behavioural changes with respect to the new product, leading to its adoption (or rejection) by the consumer. In the case of food products, learning may take place through two different processes: sensory learning (becoming accustomed to the taste) and nonsensory learning (becoming accustomed to information unusual for this product category).

On this basis, we propose the hypothesis that prolonged exposure of consumers to a product increases the preference for this product:

H1a: Prolonged consumer exposure to the product in blind testing, whether or not the wine has reduced alcohol content, encourages a sensory preference for the featured product, in comparison to the product to which they have not been so exposed.

H1b: Prolonged exposure of consumers to the product in blind testing improves the sensory hedonic evaluation of the product featured.

A study on rats by Geary et al. (2004) shows the existence of a link between the consumption of ethanol and the secretion of a hormone responsible for the sensation of satiety, cholecystokinin (CCK). This hormone, secreted by the intestine during a meal, induces a

sensation of satiety. The study shows that ethanol stimulates the secretion of CCK. These data, extrapolated to the human metabolism, may lead us to suppose that the absorption of a small quantity of ethanol may diminish the secretion of this hormone and thus postpone satiety. Thus, we must expect that the consumption of low-alcohol wine, in a blind testing situation, will be greater than that of “standard” wine, containing 13.5% alcohol.

H2a: In the situation of blind testing at home, the quantities of partially de-alcoholized wine consumed are greater than those of “standard” wine.

As we have suggested, consumer perception of a product’s virtues is influenced, in this case, by the wines available. This clearly indicates that the so-called “quality” wines are in the higher range of alcohol content, with the lower range being reserved for “table wines” of lesser quality. For example, the specifications of most of the *Appellation D’Origine Contrôlée* (AOC) dictate that the minimum alcohol level in wine may not be less than 12%. Therefore, we may suppose that consumers will be favourably influenced by the indication of a higher level of alcohol content.

H2b: Under conditions of taste testing, with information provided on the level of alcohol in the wine, the consumption of wine labelled as 10.5% alcohol should be less than for wine labelled as 13.5% alcohol.

## Methodology

To test these hypotheses, we conducted a two month experiment in the homes of 45 regular red wine consumers (in the city of Montpellier), drawn through classified advertisements. The sample was subdivided into Groups A and B. During the first month, each of the groups was successively exposed to a wine with 9% alcohol (for 15 days) and a wine with 12.5% alcohol (for another 15 days). The order of exposure was different for each group, so as to neutralize the effect of the order, as well as seasonal influences. During this first month, the two wines were consumed in blind testing conditions. The second month, the experiment consisted of exposing these two Groups A and B to a “standard” wine with an alcohol level of 12%, according to the same alternate protocol, but with different information. For a certain period, the wine was said to be 10.5% alcohol and for the other period, it was said to be 13.5% alcohol, the two extremes in the acceptable range for wine.

The measures adopted related to the hedonic scores attributed to the wines (before and after each experiment) and the actual consumption over each period. Figure 1 displays the protocol employed over the two months.

The two wines consumed in the blind testing during the first month were developed from the Merlot type of vine and were selected with the help of experts in the profession for their similar aromatic profile. Indeed, the two wines should have been equally appreciated by consumers at home, to avoid too strong a preference for one wine leading to greater consumption of this wine, without it being solely due to the level of alcohol.

The second month, the “standard” wine used contained 12% alcohol. It was also created based on Merlot, with the same type of aromatic profile as the two previous wines.

The wines were distributed in a similar and neutral bag-in-box format of five litres to avoid any influence of nonsensory information during the blind testing phase. During the phase with

information, only the level of alcohol appeared on the packaging. The bag-in-box was preferred to the bottle for practical reasons of transportation and consumer manipulation. Furthermore, the opacity of the bag-in-box gives consumers less opportunity to observe the quantity remaining and control their consumption.

Laboratory tastings before and after each period of exposure allowed us to measure preferences (hedonic score on a nonstructured scale of 10 cm, from "I do not like it at all" to "I like it a lot"). This was also the occasion to retrieve the bag-in-box packages, to measure the real consumption of the period, and to return them again to the consumers.

During these periods of exposure in the home, consumers were asked to keep track of each time they consumed the study's wine, the number of glasses taken and an estimation of the centilitres consumed. They also had to note their menu and whether the wine was suited to their menu (on a five-point scale from "not at all" to "very well"). The appropriateness of the wine with the meal was the purported objective of the experiment, allowing us to deflect the attention of consumers from the question of quantities consumed. A single bag-in-box was distributed per home but the follow-up notebook was individual. Consumers were not authorized to offer the study's wine to nonparticipants (other members of the household, guests, etc.) and had to note any exceptional act (glass spilled, glass not finished, etc.). In addition to the quantities consumed as recorded by participants in their notebooks, the bags-in-boxes were weighed before distribution and upon their return, giving an objective measure of the actual quantities consumed over the period and checking these against the consumers' reports. The wines were provided on demand and when they ran out, consumers had to contact us to be resupplied. The follow-up notebook allowed us to know the number of occasions on which wine was consumed during the period. By dividing the quantities actually consumed by the number of times wine was consumed, we obtain a statistic on average consumption per occasion during the period of exposure.

The acceptability of low-alcohol wine was, therefore, measured by preferences (hedonic score), as well as by the average quantities consumed at a time.

A sample of 45 people was recruited by classified advertisements in free newspapers (in the city of Montpellier). We were looking for consumers who drink red wine "almost every day" to have a large enough number of occasions of consumption over the 15 days to facilitate observation of the anticipated effects. The experimental protocol, long and complex, involved some who left the experiments and a sorting of the final usable data, for the experiments at home, with 24 observations for the blind testing period and 40 observations for the phase with information; and for the "laboratory" sessions, with 25 observations for the blind testing and 28 observations for the phase with information. Considering that the number of intakes during a given 2 weeks period averages 14 per person, this means that these observations cover a total number of intakes between 350 and 400.

Figure 1 : Summary of the experimental design.

Chronology of experimentation.

	1. Blind stage (1 <sup>st</sup> month)				2. Full stage (2 <sup>nd</sup> month)			
	Test 1 Hédonic score	Exposure at home (15 d.)	Test 2 Hédonic score	Exposure at home (15 d.)	Test 3 Hédonic score	Exposure at home (15 d.)	Exposure at home (15 d.)	Test 4 Hédonic score
Group A	Low- alcohol wine 9 % and Standard wine 12.5 %	Low-alcohol wine 9 %	Low- alcohol wine 9 % and Standard wine 12.5 %	Standard wine 12.5 %	Low-alcohol wine 9 % and Standard wine 12.5 % + Standard wine 12 %	Standard wine 12 % said 10.5 %	Standard wine 12 % said 13.5 %	Standard wine 12 % said 10,5 % + Standard wine 12 % said 13.5 %
Group B	Low- alcohol wine 9 % and Standard wine 12.5 %	Standard wine 12.5 %	Low- alcohol wine 9 % and Standard wine 12.5 %	Low-alcohol wine 9 %	Low-alcohol wine 9 % and Standard wine 12.5 % + Standard wine 12 %	Standard wine 12 % said 13.5 %	Standard wine 12 % said 10.5 %	Standard wine 12 % said 10,5 % + Standard wine 12 % said 13.5 %

## Results

The results for the two phases of exposure, the blind testing and the testing with information, are exposed successively, examining each time the evolution of preferences (hedonic scores) and quantities of the products consumed.

### I. Exposure to wines in blind testing conditions (phase 1 of the experiment)

#### I.1. Measure of the effects of exposure comparing hedonic evaluations

Before the blind testing exposure with two wines, with 9% and 12.5% levels of alcohol, we compared their hedonic evaluations (test n°1). We then compared these hedonic evaluations, after exposure to the information (test n°2). We also compared the evolution of these two wines' hedonic scores before and after exposure (evolution of test n°1 to test n°3).

The first test provides us with the statistically significant observation that the light wine with 9% alcohol appears to have been slightly more appreciated than the “standard” wine with 12.5% alcohol (5.57 versus 4.14) (Table 1). This runs counter to our original objective of using equivalent wines to avoid the situation where a preference for one leads to greater consumption of that wine.

Table 1 : Comparing blind hedonic score of standard vs. low-alcohol wines before exposure.

Test 1	N	Mean	s.d.	Z	Sig.
Standard wine 12.5 %	25	4.144	2.621	-1.655	0.098
Low-alcohol wine 9 %	25	5.568	2.760		

During the second blind testing (test n°2), we observe that there is a significant difference between evaluations of the low-alcohol wine and those of “standard” wine for Group A. For this group, the wine with 9% alcohol, consumed during the first fifteen days, was significantly preferred over the wine with 12.5% alcohol not consumed during this period (Table 2). But for Group B, we do not observe the opposite. Curiously, in both cases, the hedonic evaluations diminish for both products after their respective exposure during the first fifteen

days (from test n°1 to test n°2) (Table 3). However, exposure to the product seems to have reduced the diminution of hedonic evaluations for the product featured, but it is difficult to discern the effect of exposure that we were seeking. These results hardly permit us to validate H1a for the first fifteen days of the phase of blind testing.

Table 2: Comparing blind hedonic score of standard vs. low-alcohol wines after first exposure.

Test 2		N	Mean	s.d.	Z	Sig.
Group A (exposed to low-alcohol wine)	Standard wine 12.5 %	14	2.500	2.508	-1.805	0.071
	Low-alcohol wine 9 %	14	4.121	2.903		
Group B (exposed to standard wine)	Standard wine 12.5 %	11	2.173	3.078	-1.276	0.202
	Low-alcohol wine 9 %	11	3.209	3.593		

Table 3: Comparing blind hedonic score of standard vs. low-alcohol wines before and after first exposure.

		Test 1			Test 2			
		N	Mean	s.d.	Mean	s.d.	Z	Sig.
Group A (exposed to low-alcohol wine)	Standard wine 12.5 %	14	3.814	2.293	2.500	2.508	-1.503	0.133
	Low-alcohol wine 9 %	14	4.464	2.003	4.121	2.903	-0.596	0.551
Group B (exposed to standard wine)	Standard wine 12.5 %	11	4.564	3.050	2.173	3.078	-1.871	0.061
	Low-alcohol wine 9 %	11	6.973	3.032	3.209	3.593	-2.802	0.005

During the third tasting under blind testing conditions (test n°3), we observe that there is no significant difference between evaluations of the low-alcohol wine and that of “standard” wine for the two groups (Table 4). However, the results tend to support Hypotheses H1a and H1b, since the preferences favour the wine consumed during this period. Furthermore, in each of the two groups, the hedonic evaluations increase significantly for the product featured after their respective exposure during the second fifteen day period, between test n°2 and test n°3 (Table 5). Exposure to a product seems to have had more of an effect in this case, after the second period of exposure (2nd fifteen day period) rather than after the first period of exposure (1<sup>st</sup> fifteen day period).

Table 4: Comparing blind hedonic score of standard vs. low-alcohol wines after second exposure.

Test 3		N	Mean	s.d.	Z	Sig.
Group A (exposed to low-alcohol wine)	Standard wine 12.5 %	14	4.171	2.125	-0.943	0.345
	Low-alcohol wine 9 %	14	3.714	2.343		
Group B (exposed to standard wine)	Standard wine 12.5 %	11	3.091	2.654	-0.934	0.350
	Low-alcohol wine 9 %	11	4.473	3.283		

Table 5: Comparing blind hedonic score of standard vs. low-alcohol wines before and after second exposure.

		Test 2			Test 3			
		N	Mean	s.d.	Mean	s.d.	Z	Sig.
Group A (exposed to low-alcohol wine)	Standard wine 12.5 %	14	2.500	2.508	4.171	2.125	-2.292	0.022
	Low-alcohol wine 9 %	14	4.121	2.903	3.714	2.343	-0.628	0.530
Group B (exposed to standard wine)	Standard wine 12.5 %	11	2.173	3.078	3.091	2.654	-0.978	0.328
	Low-alcohol wine 9 %	11	3.209	3.593	4.473	3.283	-2.193	0.028

Finally, if we compare the evaluations of the third tasting (test n°3) to those of the first (test n°1), therefore after the successive testing of two products under blind testing conditions, we may observe that hedonic evaluations of the low-alcohol wine at the 9% level of alcohol remain superior to those of the “standard” wine at 12.5% alcohol, but that the difference is no longer significant (Table 6).

Table 6: Comparing blind hedonic score of standard vs. low-alcohol wines after exposure to the two products.

Test 3	N	Mean	s.d.	Z	Sig.
Standard wine 12.5 %	25	3.696	2.383	-0.229	0.819
Low-alcohol wine 9 %	25	4.048	2.759		

To summarize this initial analysis, the evolution of hedonic evaluations during the first month does not consistently support Hypotheses H1a and H1b, except for the second period (2<sup>nd</sup> fifteen-day period). In addition, the initial marked preference for the wine at the 9% alcohol level is much less at the end of the first month.

### ***1.2. Measure of the effects of exposure by quantities consumed in blind testing***

We also measured the quantities consumed by adding up the consumption of the same wines by Groups A and B. (We should remember that the groups alternated the consumption of the two wines).

The different consumption of the low-alcohol wine and the “standard” wine in blind testing, expressed in centilitres consumed at a time, were processed using the Wilcoxon’s test, due to the small sample size. The average number of occasions over 15 days is 13.4 for the sample in the blind testing phase.

Under blind testing conditions, we observe that the quantities of low-alcohol wine consumed at home were not significantly different from those of “standard” wine (Table 7). The expected effect of the delay in satiety that should have contributed to greater consumption of low-alcohol wine could not be observed, which does not allow us to verify Hypothesis H2a.

Table 7: Comparing quantities consumed for “standard” wine vs. low-alcohol wine in blind testing.

Quantities consumed per meal in blind condition	N	Average number of meal	Mean (cl/meal)	s.d.	Z	Sig.
Standard wine 12.5 %	24	13.8	22.118	10.697	-0.214	0.830
Low-alcohol wine 9 %	24	13.0	21.820	9.855		

## II. Exposure to wines in full condition (phase 2 of the experiment)

### II.1. Measure of the effects of exposure by comparing hedonic evaluations

After the consumption at home of wine with 12% alcohol, with one group being told that this was 10.5% alcohol and the other that it was 13.5%, test n°4 allows us to observe that consumers’ hedonic evaluations of this same wine are significantly different: 5.675 when told it is 13.5% alcohol, versus 3.639 when told it is 10.5% alcohol (Table 8). This gap supports our supposition that French consumers tend to associate a higher level of alcohol with a better quality wine.

Table 8: Comparing hedonic score of wine labelled 13.5% alcohol vs. wine labelled 10.5% alcohol after exposure to this two informations.

Test 4	N	Mean	s.d.	Z	Sig.
Wine labelled 13.5% alcohol	28	5.675	2.428	-3.291	0.001
Wine labelled 10.5% alcohol	28	3.639	2.095		

### II.2. Measure of the effects of exposure by quantities of wine consumed according to the information provided on the alcohol level

Comparison of the average quantities consumed each time for wine labelled 13.5% alcohol and that of the same wine labelled 10.5% alcohol were done with the help of the Student’s t test (sample greater than 30).

If we consider the actual consumption in phase 2, during which consumers had information on the alcohol level of the wine (either 10.5% alcohol, or 13.5% alcohol), we observe that quantities consumed of wine labelled low-alcohol (unusual for the product category) were not significantly less than of wine labelled higher alcohol, and that we considered more typical of a quality wine (see Table 9). This result suggests that information on an alcohol level weaker than is usually the case for quality wine is psychologically acceptable for consumers. Thus, Hypothesis H2b, assuming that consumers would diminish their consumption of wine labelled as 10.5% alcohol, was not verified.

Table 9: Comparing quantities consumed for wine labelled 13.5% alcohol vs. wine labelled 10.5% alcohol (paired t-test).

Quantities consumed per meal in information condition	N	Average number of meal	Mean (cl/meal)	s.d.	Mean difference	s.d.	t	Sig.
Wine labelled 13.5% alcohol	40	14.5	24.900	14.763	0.021	10.020	0.013	0.989
Wine labelled 10.5% alcohol	40	14.3	24.921	15.114				

## Discussion

The objectives of this study were to observe the effects of prolonged exposure on consumer acceptance of a significantly altered product. This acceptability was measured with the aid of hedonic evaluations before and after exposure, as well as through observation of actual quantities of the product consumed over time. We discuss now successively the results obtained under blind and under full information conditions.

Results from blind experimentations:

We observed first that the two wines were not comparable and that the 9% alcohol wine was preferred against the 13% wine at the very start of the experimentation. Although this may be merely a result of the researchers choice of wines, this result support those of Masson et al. (2007), who show that white, rosé and red partially de-alcoholized wines compared in blind tasting to equivalent “standard” wines in their category are more appreciated (but not significantly so). There is then some evidence that, in a comparative situation of wine blind tasting, a lower content of alcohol would favour consumer preference.

We had suggested that prolonged exposure of consumers to the product would engender a significant preference for this product (H1a) and a significant improvement in its hedonic evaluation (H1b). Finally, after a first phase of exposure, we observed that the evaluation of low-alcohol wine was higher than that of “standard” wine, but that the difference was only significant for Group A. We also observed that, while the hedonic evaluation of wines diminishes after exposure, that of wine featured at home diminished less than the wine not featured. The decrease in hedonic evaluations from test n°1 to test n°2 is only explicable by the experimental measure whereby consumers seem to have been systematically more severe during the 2<sup>nd</sup> test. The exposure to one of the two products would, however, have limited this diminution. Then, after a second phase of exposure, we observed that evaluations of the wine featured increased significantly for both groups and that that of the wine not featured only decreased for Group A and not significantly. Our results do not allow us to conclude with enough confidence that there is a “mere exposure” effect in the sense of Zajonc (1968), since we obtain effects for certain periods of exposure but not for others and for one group of consumers but not the other.

Concerning the quantities consumed, we had suggested that those of low-alcohol wine would be, in blind testing, higher than those of “standard” wine (H2a), reflecting a greater physiological phenomenon of satiety for a wine with a higher alcohol content. Our results do not support this hypothesis, based on the work of Geary et al. (2004).

Results under full informations condition:

The hedonic evaluations during the 4<sup>th</sup> test show that the same wine labelled as having a 12% alcohol content is perceived differently if it is labelled as 13.5% alcohol or 10.5%. The

favourable expectation of that labelled as 13.5% alcohol, therefore, would have created the effect of assimilation that would have enhanced the perceived quality of the product in order to be consistent with the information, as suggested by the theory of disconfirmation of expectations (Anderson, 1973 ; Schifferstein et al., 1999). Remember that this assimilation is positive when the information is favourably perceived (for example, a positive indication on the packaging, such as a prestigious brand, some reference to origin, etc....) or negative when the information is unfavourably perceived (no name brand, unknown label, etc.) as shown by, for example, Lange et al. (2002) in the case of Champagne, or Fornerino et al. (2006) in the case of orange juice. In earlier research (Masson et al., 2007), the label “standard” wine created much greater consumer expectations than the label low-alcohol wine. Thus, we had suggested that, in giving consumers information on the level of alcohol, the quantities consumed of the wine labelled as 10.5% alcohol would be less than those of the wine labelled as 13.5%, a higher level of alcohol being linked to a higher quality of wine (H2b). But the consumption observed was statistically equivalent and does not allow us to validate this hypothesis. In this case, we may then conclude that the results of the disconfirmation of expectations model differ depending on the method employed, transversal or longitudinal, leading to the question of whether the same measure (in our experiment, hedonic preference) can be compared in both cases.

The slight difference in quantities consumed as a function of information on the alcohol level could be explained by the information not being sufficiently disconcerting. Indeed, information on a “13.5% alcohol” level could not have led to specific behaviour since many wines have this level of alcohol. As for the information on a “10.5% alcohol” level, the level of alcohol was perhaps not low enough to be perceived as inconsistent with the category of product and lead to reticent behaviour (since a low-alcohol wine is often perceived as poor quality) or, the reverse, attraction (in allowing oneself to consume more, given the low-alcohol level). Thus, a 3% difference in alcohol level does not seem to have a determining psychological influence on wine consumption, since it remains within the current range employed for the category of wine.

These results on quantities consumed may also be explained by patterns of consumption, that may be independent of the quality of wines consumed (for example, the habit of drinking two glasses at each meal). Indeed, we observe that the average quantities consumed per meal are around 22 - 24 cl, corresponding to two glasses.

These results should be considered within the limitations of the study. We have already emphasized that the smallness of our sample does not favour the detection of subtle differences. Then, too, despite the many instructions given to the participants, uncertainties arise as to their use of the products provided in the home, leading to a major elimination of suspect data, resulting in a loss of observations. In our future experiments we would be particularly attentive to the way in which respondents evaluate the quantities consumed or rejected. In addition to that, the periods of exposure at home might not have been sufficiently long to entail familiarity and a preference for the product featured. As for the selection of products, it is possible that, remaining within the acceptable range in terms of alcohol level, we did not create a sufficient psychological rupture to lead consumers to modify their behaviour. Thus, follow-up research should take these limitations into account.

This study provides indications to wine producers who wish to offer low-alcohol wine. On the sensory level, reduced alcohol in wine does not seem to be a negative factor, and it is even possible to create a positive taste preference for low-alcohol products, as the blind testing

evaluations reveal. When the consumer is informed about the alcohol level, product testing at home for fifteen days shows that the consumption level is comparable for the two wines. At the end of this experiment, we can say that the reduction in alcohol level does not seem to be an obstacle to acceptability and consumption of partially de-alcoholized wines, when the level of alcohol remains within the minimum level of the category wine.

*This research was conducted within the framework of the “VDQA” (Vins De Qualité à teneur réduite en Alcohol (Quality Low-Alcohol Wine)) project financed by the Programme National de Recherche en Alimentation et en nutrition humaine 2006-2008 (the National Food and Human Nutrition Research Program) of the Agence Nationale de la Recherche (National Research Agency). It was led jointly by the Fédération Héraultaise des Vins de Pays and the UMR MOISA. We would particularly like to thank the following student engineers of Supagro Montpellier for their much-appreciated assistance during the organization and running of the experiments: Adeline Boire, Anne Bouter, Alexandre Fougedoire, and Marie Maj.*

## Bibliographie

Anderson R.E. (1973), Consumer dissatisfaction: the effect of disconfirmed expectancy on perceived product performance, *Journal of Marketing Research*, 10, 1, pp 38-44.

Aurier, Philippe (2007), "Vins, boissons et contextes de consommation," in La consommation de vin en France - Enquête Viniflor-Université Montpellier 2 - Vague 2005, Aigrain P. Aurier Ph., Brugière F., Ed.: Série Cahier de recherche du CR2M, n° 03-2007-1.

Cohen E., d'Hauteville F., Goodman S., Lockshin L., Sirieix L. (2008), A cross cultural comparison of choice criteria for wines in restaurants, paper submitted for the 4<sup>o</sup> Symposium of the Academy of Wine Business Research, Siena.

Cordelle, Sylvie, Christine Lange, and Pascal Schlich (2004), "On the consistency of liking scores: insights from a study including 917 consumers from 10 to 80 years old," *Food Quality and Preference*, 15 (7-8), 831-41.

Cordelle, Sylvie, Dag Piper, and Pascal Schlich (2005), "On the consistency of liking scores: a validation study run in France and Germany," *Food Quality and Preference*, 16 (6), 493-503.

D'Hauteville F. (1994), Consumer Acceptance of Innovation: the Case of Low Alcohol Wines, *International Journal of Wine Marketing*, n°6, MCB press, London.

Deliza R. et MacFie H.J.H. (1996), The generation of sensory expectation by external cues and its effects on sensory perception and hedonic ratings: a review, *Journal of Sensory Studies*, 11, pp. 103-128.

Goldsmith R. E. (1992), The validity of a scale to measure global innovativeness, *Journal of Applied Business Research*, 7,2, 89-97

Fornerino M., d'Hauteville F. (2006) La non confirmation des attentes comme outil de diagnostic d'une marque. Une approche sur le jus d'oranges. Actes du XXII<sup>o</sup> Congrès de l'Association Française du Marketing, 11-12 Mai 2006, Nantes.

Geary N., Massi M., Polidori C., Policani F., Wolfe A. (2004), Exogeneous and endogenous CCK inhibit ethanol ingestion in Sardinian alcohol-preferring rats

Köster, E. P., T. Couronne, F. Leon, C. Levy, and A. S. Marcelino (2003), "Repeatability in hedonic sensory measurement: a conceptual exploration," *Food Quality and Preference*, 14 (2), 165-76.

Laporte, J.P. (2007), "Effet d'âge et effets de générations : Projections des comportements individuels de consommation de vin en France à l'horizon 2015.," in La consommation de vin en France - Enquête Viniflor-Université Montpellier 2 - Vague 2005, Aigrain P. Aurier Ph., Brugière F., Ed.: Série Cahier de recherche du CR2M, n° 03-2007-1.

Lange C., Martin C., Chabanet C., Combris P., Issanchou S. (2002), Impact of the information provided to consumers on their willingness to pay for Champagne : comparison with hedonic scores, *Food Quality and Preference*, 13, pp 587-608

Lévy, C. M. and E. P. Köster (1999), "The relevance of initial hedonic judgements in the prediction of subtle food choices," *Food Quality and Preference*, 10 (3), 185-200.

Masson J., Aurier P., d'Hauteville F. (2008), "Effects of non sensory cues on perceived quality: the case of low alcohol wine", *International Journal of Wine Business Research*, to be published.

Migdley D. et Dowling G.(1978), "Innovativeness : the concept and its measurements", *Journal of Consumer Research*, 4,229-242

Pliner, Patricia (1982), "The effects of mere exposure on liking for edible substance," *Appetite*, 3 (3), 283-90.

Porcherot, Christelle and Sylvie Issanchou (1998), "Dynamics of liking for flavoured crackers: Test of predictive value of a boredom test," *Food Quality and Preference*, 9 (1-2), 21-29.

Roehrich G.(1987), "Nouveauté perçue d'une innovation" recherche et Application en Marketing, 1, 1-15.

Schifferstein H.N., Kole A.P.V., et Mojet J. (1999), "Asymmetry in the disconfirmation of expectations for natural yogurt," *Appetite*, 32, pp 307-329

Siegel, P.S. and F.J. Pilgrim (1958), "The Effect of Monotony on the Acceptance of Food," *American Journal of Psychology*, 71, 756-59.

Stang, D.J. (1975), "When familiarity breeds contempt, absence makes the heart grow fonder: effect of exposure and delay on taste pleasantness rating," *Bulletin of Psychonomic Society*, 6 (3), 273-75.

Tuorila H., Meiselman H., Bell R., Cardello A.V., Johnson W. (1994) "Role of sensory and cognitive information in the enhancement of certainty and looking for novel and familiar foods," *Appetite*, 23, pp 231-246

Zajonc, R.B. (1968), "Attitudinal Effects of Mere Exposure," *Journal of Personality and Social Psychology*. Monograph supplement, 9 (2), 65-74.

Zajonc, Robert B. and Hazel Markus (1982), "Affective and Cognitive Factors in Preferences.," *Journal of Consumer Research*, 9 (2), 123.