MEASURING PREFERENCES AND CONSUMER CHOICE IN WINE CONSUMPTION

The issue of climate change

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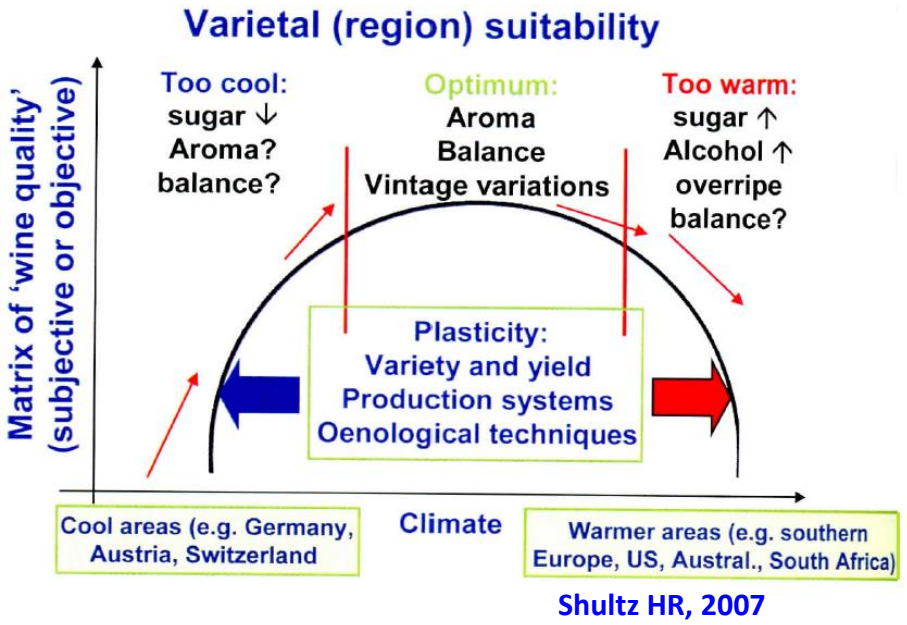
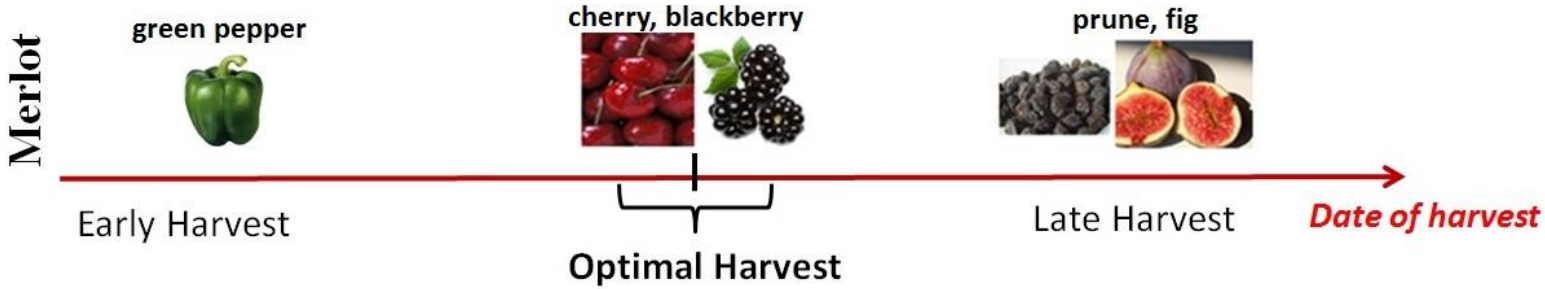
General working hypothesis

- **Change the intrinsic and extrinsic characteristics of wines, and therefore <u>also change the consumer information (labeling).</u>**



Shultz HR, 2007

These changes may reflect strategic choices of modes of production that are observed today (choice of harvest date, production methods, etc..), Influencing the final aromatic nuances, alcohol degree, acidity (PH) of wines.



Key research questions

1. What are the consumers' reactions and expected purchase behavior in relation to changes in the organoleptic characteristics of new wines from Climate Change? (Sensory and Economic Arbitration).

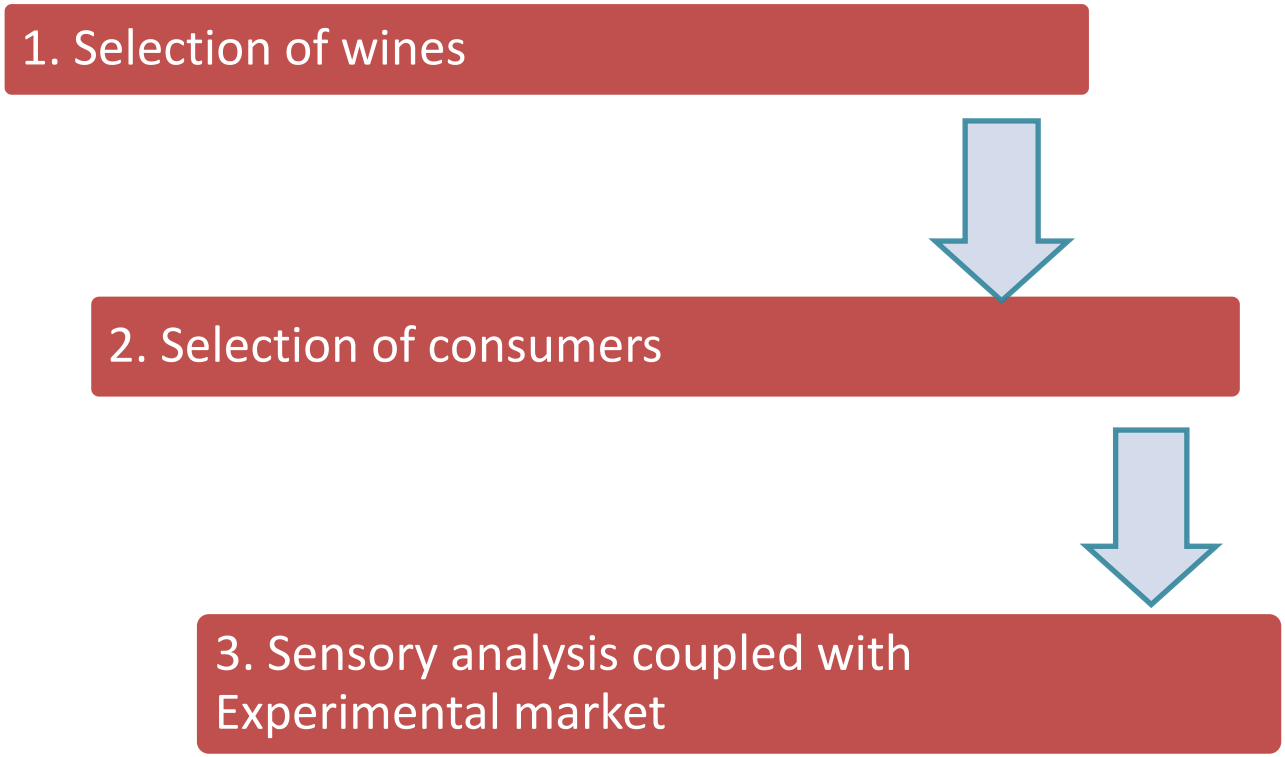
- ***Innovations : fundamental way to optimize and improve the systems of production and marketing, and the final product quality, to meet the needs and expectations of producers and consumers***

However, same question:

2. What are the consumers' reactions and expected purchasing behavior regarding wines from innovations? (Sensory and Economic arbitration).

Two experiments for two research questions

- **Both with a protocol of Sensory Analysis and Experimental Economics experience is set up with the objective of evaluating the consumer's preference through hedonic ratings and their willingness to pay.**



Experiment Design and Method

First experiment

Selection of wines

	Wine A	Wine C	Wine B	Wine A'
Alcohol degree	14°	14,5°	15°	15°
Aromas of wine	Fresh fruit 	Intermediate Wine	Cooked fruit 	

- Three wines selected by experts (A, B and C) and a fourth wine modified in their alcohol content from wine A (A'). Wine A' : °A' =°A + 1,3° °A=°B= 15,2°
- Wine B: representative of climate change and / or a late harvest
- Wine A: a harvest date "traditional or normal"

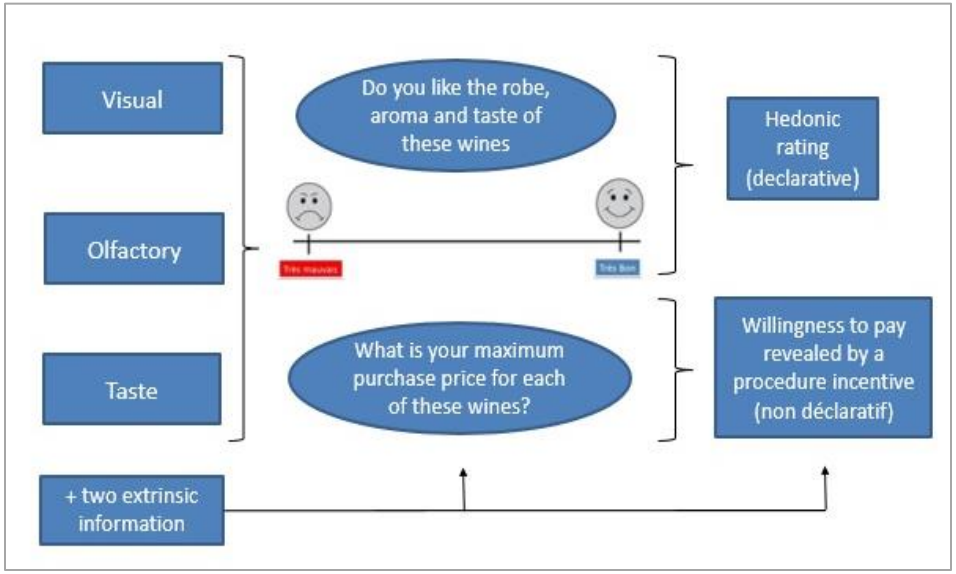
Selection of consumers

184 consumers (87 women – 97 men)				
	Average	**Standard deviation**	**Min**	**Max**
Age	46			
Level education 1=Secondary education, 2= Postsecondary non-tertiary education 3=Tertiary education	2,5	0,55	24	73
Frequency of consumption (bottles per week)	1,98	0,71	1	3
Per capita income (euros per month)	2130	703,98	1400	4500

Type of consumer: "buyer and regular consumer" of wine, representative of different age segments, with a gender balance

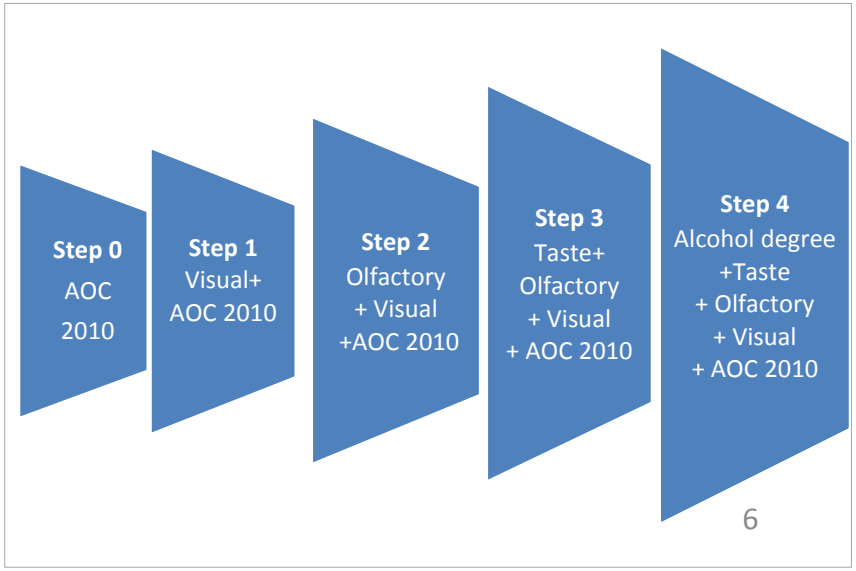
Experiment Design and Method
First experiment

Diagram of sensory analysis protocol coupled with experimental economics (in a sensory analysis room)



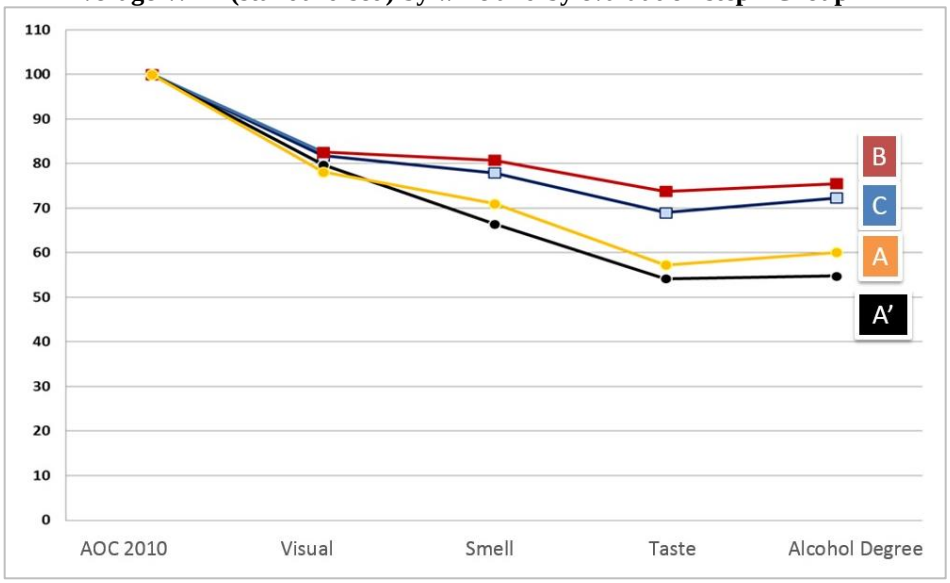
- Two groups for the first experiment: G1 and G2. Each group of 97 consumers
- The main features of the protocol are common to both groups. However, an additional procedure was introduced for Group 2, in which wines A and B are consumed at home, in a sustained, regular and repeated consumer context in order to study the stability (changes) of consumer preferences.

Diagram of the protocol growing information



Results of the first experiment

Average WTP (standardised) by wine and by evaluation step - Group 1

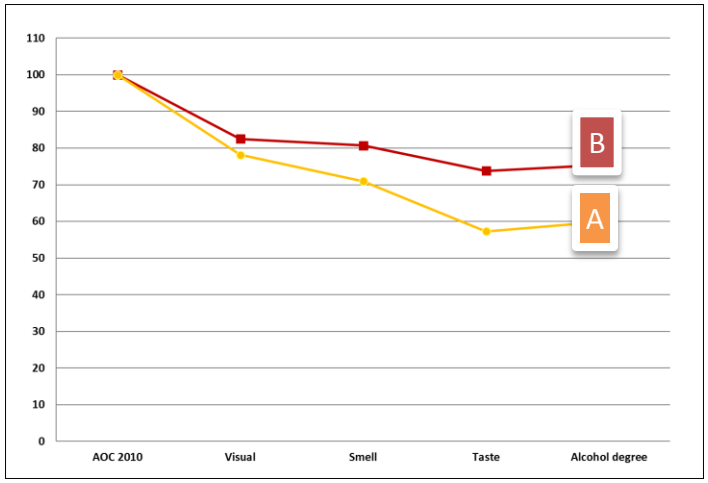


Hierarchy of wines
Preferences group 1
Wine B < Wine C < Wine A < Wine A'

Significant difference (ANOVA and Duncan's multiple range tests p<0,05)**:**

- **Wine B > Wines A and A' (taste and alcohol degree steps)**
- **Wine C > Wine A'**

Comparison of extreme wines A and B - Group 1

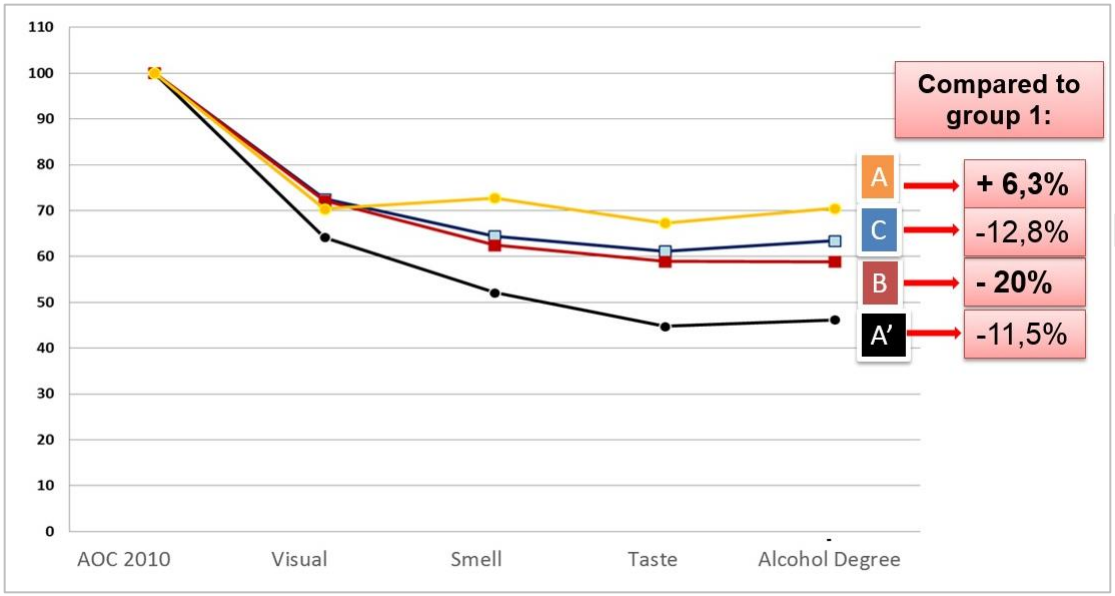


Significant difference (ANOVA and Duncan's multiple range tests p<0,05)**:**

- **Wine B preferred to Wine A at taste and alcohol degree steps.**
- **Not significant at olfactory step**

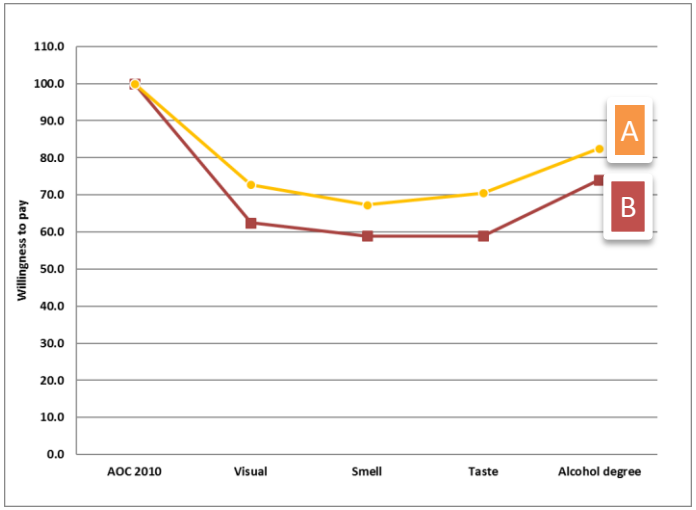
Results of the first experiment

Average WTP (standardised) by wine and by evaluation step - Group 2



New Hierarchy of wines
Preferences group 2
Wine A > Wine C > Wine B > Wine A'

Comparison of extreme wines A and B - Group 2



Change in preferences: However, this differences are not significant

Conclusion of the first experiment

- ✓ The results in both groups suggest that consumers do not discriminate wines in the same way, and it depends on the intrinsic and extrinsic information which are revealed at each evaluation step
- ✓ We confirm the importance of belief characteristics in preferences of wines, but we find that the end result in discrimination of the wines, is defined ex-ante with olfactory and taste evaluation steps. Econometric Modelling confirm this result.
- ✓ The results obtained show that the significant differences between the wines, and the preferences resulting from them depend on:

  i) Each wine, including its organoleptic characteristics.

  ii) Each evaluation step, including the information that consumers have at some point.

  iii) Each group, because both groups received a different treatment. The home consumption of wines A and B in group 2 had a significant impact in consumer preferences.

- ✓ According to the results of two groups, it is important to examine more specifically the issue of "stability preferences" of consumers.

Now that we know how consumers react to changes on quality of wines as consequence of climate change…

The next step is to know how consumers react in relation to innovations….

Experiment Design and Method
Second experiment

Selection of wines

Rosés wines		Red wines		
PH (acidification)		Alcohol degree (dealcoholization)		
Wine A	Wine B	Wine C	Vin D	Vin E
3,57	3,41	14°	12°	10°

- Five wines used for the experiment and two innovations. Two rosés wines (A and B) and three reds wines (C, D and E).
  - A = control wine (not acidified) and B = wine A acidified
  - C = control wine (not dealcoholized), D and E wines = dealcoholized wines from wine C.

PH and alcohol degree: two intrinsic characteristics affected by climate change and with potential impact on consumer perception (labelling and/or health claims)

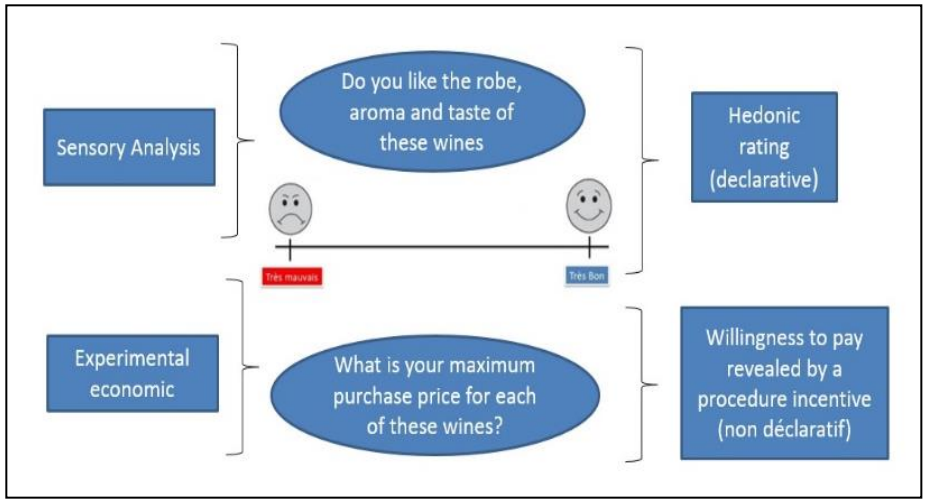
Selection of consumers

60 consumers (25 women – 35 men)				
	Average	Standard deviation	Max	Min
Age	44,5	11,5	70	27
Gender (1=woman)	0,41	0,59	1	0
Age group	**20-30 years**	**31-49 years**	**50 years and more**	
N° consumers	12	27	21	

Type of consumer: researchers and professionals of the wine sector

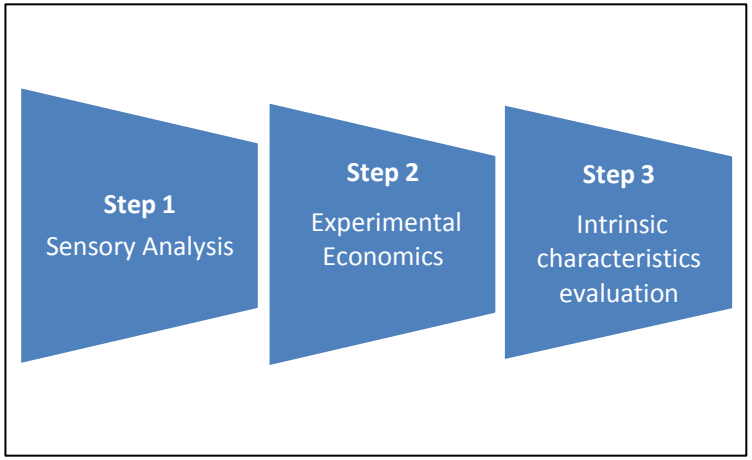
Experiment Design and Method
Second experiment

Diagram of sensory analysis protocol coupled with experimental economics



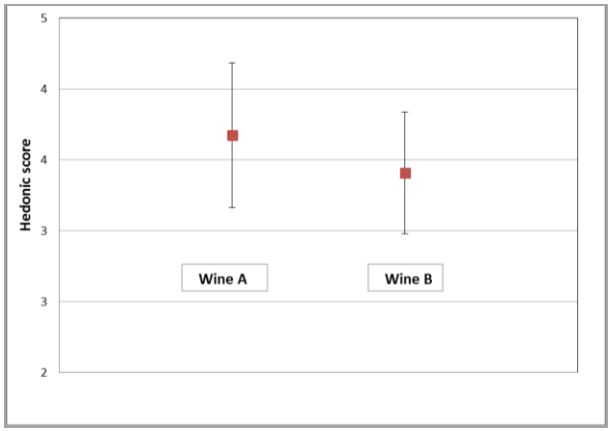
Wine tasting at experiment unit INRA Pech Rouge

Diagram of the protocol growing information

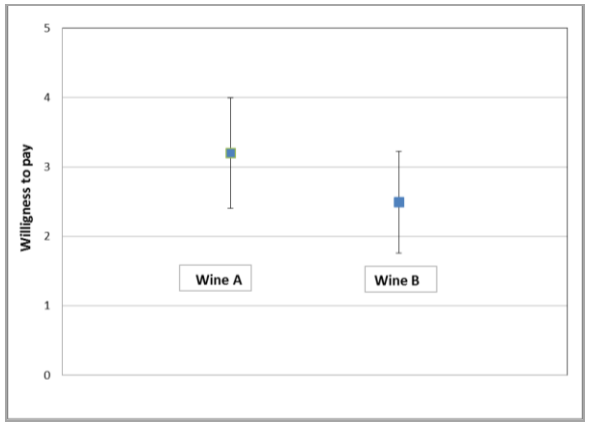


Results of the second experiment

Confidence intervals (95%) – Hedonic Score – Rosés wines



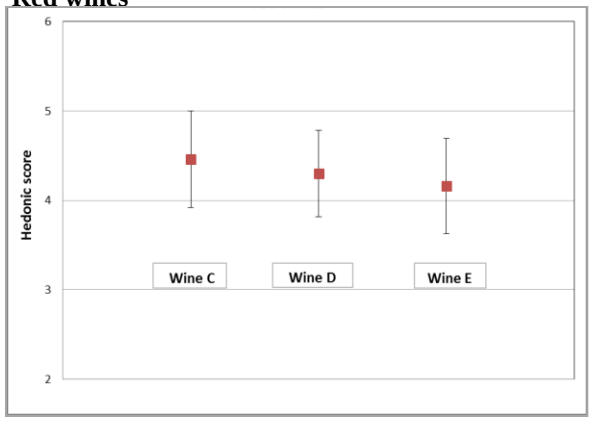
Confidence interval (95%) – Willingness to pay – Rosés wines



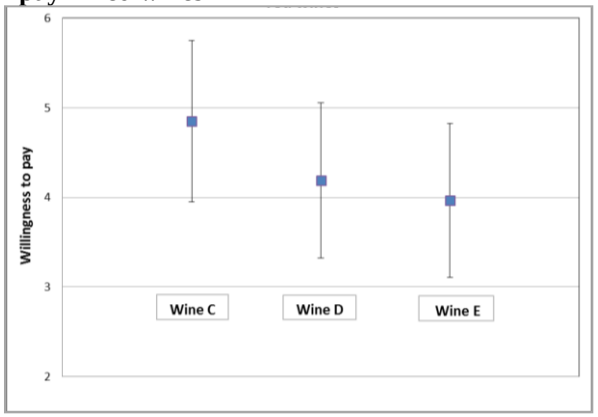
Wine A is slightly preferred to wine B
However, these differences in preferences between wines A and B is not significant

And regarding the red wines (dealcoholization)?

Interval confidence (95%) – Hedonic Score – Red wines



Interval confidence (95%) – Willingness to pay – Red wines



Wine C is preferred to wines dealcoholized D and E
However, these difference in preferences is not significant

What can we to conclude from these results? :

- ✓ Consumers do not discriminate against wine from an organoleptic point of view?
- ✓ Innovations do not meet consumer expectations? and / or innovation is not effective to alter the organoleptic characteristics?

Results of the second experiment

We made some further analysis on the results to highlight the existence of preference groups

Consumer preferences Rosés wines – Innovation acidification						
	Hedonic scores			Willingness to pay		
Type of preference	**Nb**	**Average**	**Average Nb=60**	**Nb**	**Average**	**Average Nb=60**
Wine A	**30**	5	3,7	**23**	5,9	3,2
Wine B	**20**	4,5	3,4	**17**	5	2,5
Wine A= Wine B	**10**	1,9		**20** (18 refusals to purchase)		

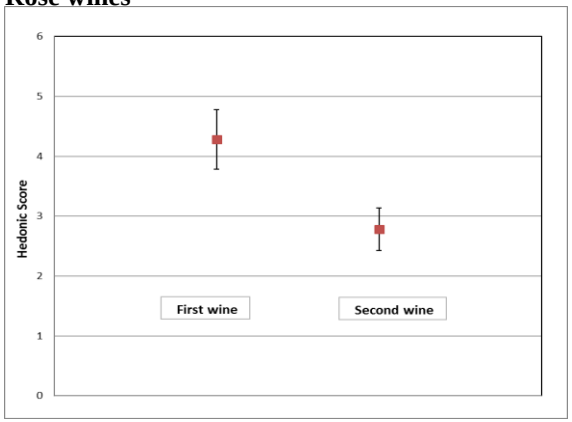
In the same way for red wines

Consumer preferences red wines – Innovation dealcoholization						
	Hedonic scores			Willingness to pay		
Type of preference	**Nb**	**Average**	**Average N=60**	**N**	**Average**	**Average N=60**
Wine C > Wine D	29	5,8	4,5	28	7,7	5,3
Wine C > Wine E	31	5,9		27	8	
Wine C > Wines D, E	**24**	**6,1**		**21**	**8,6**	
Wine D > Wine C	23	5,8	4,3	22	7,8	4,9
Wine D > Wine E	28	5		23	7,1	
Wine D > Wines C, E	**14**	**5,9**		**15**	**8,1**	
Wine E > Wine C	23	5,6	4,2	20	7,7	4,7
Wine E > Wine D	24	5,5		22	7,1	
Wine E > Wines C, D	**14**	**5,9**		**14**	**7,6**	

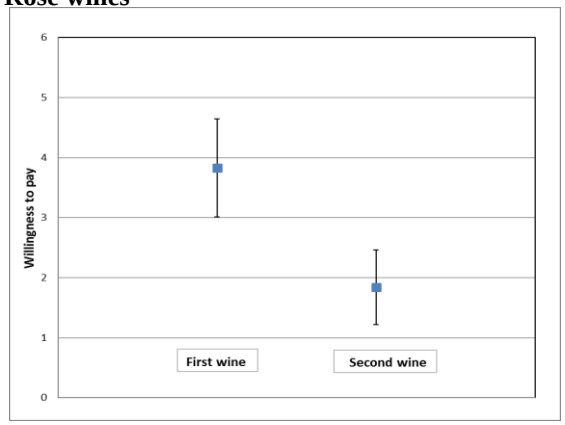
<u>The existence of preference groups</u>

Results of the second experiment

Confidence intervals (95%) – Hedonic Score – Individual preferences - Innovation Acidification Rosé wines



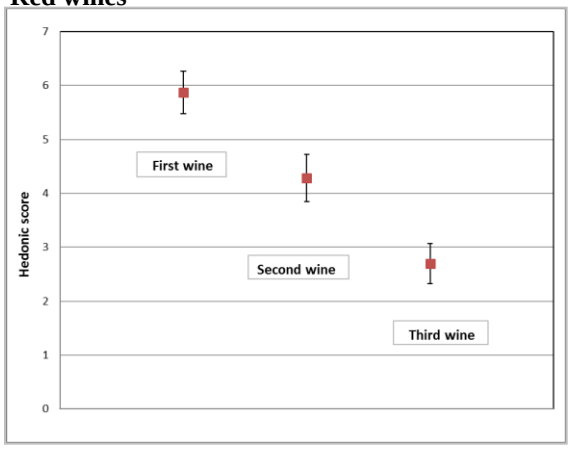
Confidence interval (95%) – Willingness to pay – Individual preferences - Innovation Acidification Rose wines



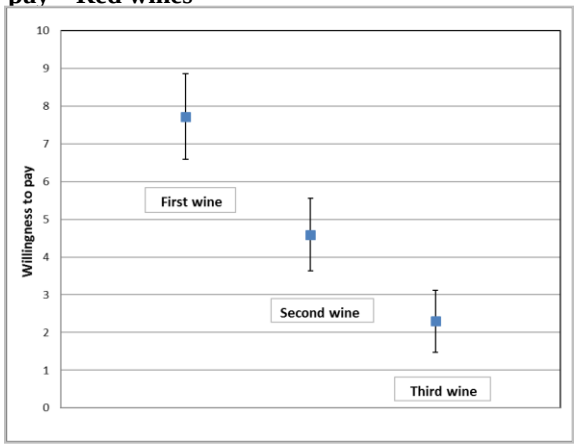
Significant difference between preferences for rosés wines

And regarding the red wines (dealcoholization)?

Interval confidence (95%) – Hedonic Score – Red wines



Interval confidence (95%) – Willingness to pay – Red wines



Significant difference between preferences for red wines

What can we to conclude from these results? :

- ✓ Consumers discriminate wines from an organoleptic point of view
- ✓ Absence of vertical differentiation as we can observe in the first experiment. However, ***we can see the existence of an horizontal differentiation***

General conclusion

- ✓ Concerning the methodology, the originality of this study first comes from coupling the sensory analysis with the establishment of an experimental market.
- ✓ The second originality of this study lies on our step by step approach of the revelation of the WTP: following the "natural" discovery of a wine, starting with the colour, the aromas added to the colour and the flavour added to the colour and aroma, and finishing with extrinsic information.
- ✓ A third novelty of our study is mainly due to the inclusion of the repeated consumption. We wanted to analyse the subject of the “stability of consumer preferences”, with the inclusion of a prior tasting "at home".
- ✓ Concerning results:

1. From the first experiment, we have shown the fragility of consumer judgments that they may have on short-term preferences.

2. The results in both groups suggest that consumers do not discriminate wines in the same way, and it depends on the intrinsic and extrinsic information which are revealed at each evaluation step

3. From the second experiment, we were interested in studying the perception of consumers in relation to wines arising from oenological innovations.

General conclusion

3. The second experiment allowed us to understand the way innovations, which are already present in the wine industry, could both guarantee and address, the respect of the consumer's expectations on taste, safety and/or health, while ensuring the continued or increased productivity of the industry players.

4. The study should contribute to the debate on the implementation of regulations on the labelling of wines, especially from the point of view of the consumer's expectations.

- **Our study and the results seem essential to us if we are to make projections on matching supply and demand and future market balances. The multidisciplinary nature of our study can be considered as an effective methodology to understand the consumers' behaviour in relation with the major challenge of climate change, which can have important consequences on the wine industry.**

Thank you for your attention

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