CONSUMER PREFERENCES FOR QUALITY LABELS OF SAFFRON IN THE SPANISH REGION OF ARAGON

Ana María Sánchez , Cristina Mallor and Azucena Gracia

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Consumer preferences for quality labels of saffron in the Spanish Region of Aragón

Cristina Mallor

Departamento de Ciencia Vegetal (CITA)

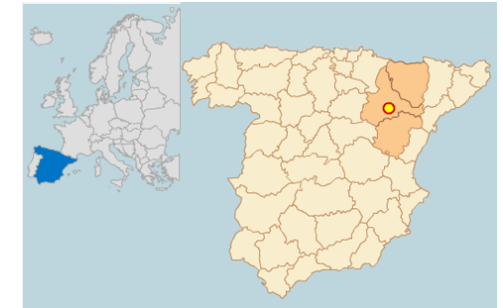Instituto Agroalimentario de Aragón (IA2)

Azucena Gracia

Unidad de Economía Agroalimentaria (CITA)
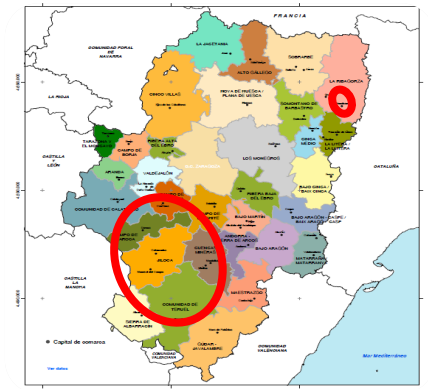
Instituto Agroalimentario de Aragón (IA2)

CENTRO DE INVESTIGACIÓN Y TECNOLOGÍA AGROALIMENTARIA DE ARAGÓN

Introduction

- Saffron: sustainable high value agricultural product.

- Aragon: saffron was cultivated in several rural areas but the cultivation of this crop suffered a progressive abandonment and a sharp decline because:

  - Spanish saffron is less competitive in the international markets than saffron produced from other countries.

  - Domestic consumption decreased which accentuates the decrease of saffron cultivation.

Introduction

For the success of the saffron activity in rural areas some requisites are needed:

- To produce and supply a <u>high quality saffron</u>.
- To communicate the quality characteristics preferred by consumers of the local saffron.

To increase the consumption of local saffron.
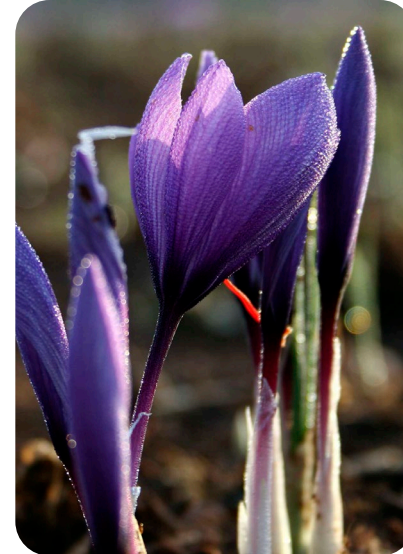
Objective

The aim of this work is to study which of the available **labels** to ensure and <u>communicate</u> the quality, origin, and/or production system of saffron **were the most and the least preferred by consumers in Aragon.**

Protected Designation of Origin (PDO) [a]	Alimentary Quality of Aragón C'ALIAL	Alimentary Craftsmanship from Aragón [b]	EU organic farming with indication of the authorized control body [c]	Slow Food [e]

C'ALIAL and "Artesania Alimentaria de Aragón": quality labels regulated at regional level
Slow Food: endorsed by the Slow Food movement ("Baluarte" "Azafran del Jiloca")

C'ALIAL is a guarantee brand owned by the Government of Aragon, which identifies Aragonese quality products, which are distinguished by their special gastronomic, healthy and nutritional traits.
Aragonese Artisan Foods are produced, handling and transformed using traditional manual techniques that respect the environment being natural products linked to the Aragonese cultural and gastronomic traditions.

Theoretical framework

Direct ranking preference method.

Respondents have to rank the five labels from 1 (the most preferred) to 5 (the least preferred).

Statistical analysis.

1) Probabilities of different ranks (first, second, etc.) and rank means.

2) After transforming the data, **this new data** can be used **within the random utility theory framework (RUM) and the Lancaster's characteristics demand theory**

Theoretical framework

Lancaster stated that total utility depends on the product's characteristics.

This utility is known to the individual but not to the researcher:

- The researcher observes some attributes, in our case, the labels included in the direct rank question ($\beta' x_{njt}$)

- But not others that can be treated as stochastic within the random utility model

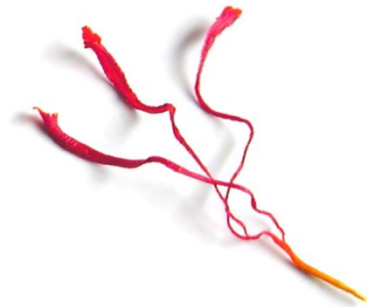$$U_{njt} = \beta' x_{njt} + \varepsilon_{njt}$$

Rank-ordered mixed logit model is specified with <u>transformed data.</u>

Specification and estimation

Original data was re-coded by treating each rank as a sequential choice process where respondents make a discrete choice between alternatives (Train, 2003).

- For the first pseudo-observations, the choice set includes j (j=5) alternatives. The choice variable identifies the alternative ranked as the most preferred.

- For the second, the alternative ranked first is discarded, leading to a choice set of J-1 alternatives and the choice variable identifies the alternative ranked first.

- Untill only two alternatives remains

- Therefore, the ranking of J alternatives is represented as J-1 independent choices - **New data**

The NLOGIT software was used to estimate.

Heterogeneity analysis

- Estimated coefficients of the mixed logit ranked model for each of the respondents **(β′)** were used as **segmentation variables** to group them with a **cluster analysis (k-means).**

- **The obtained segments were profiled** using their socio-demographic characteristics, as well as the saffron knowledge, hedonic preferences, and use, production knowledge, importance of label information, food consumption motives and habits, and purchasing and cooking habits. Food neophobia was also used in consumer profiling.

- **Bivariate analyses were used to test** differences across clusters for these **characterization variables**. According to the nature of these variables, the **analysis of variance and the Bonferroni test or the Pearson chi-square** test were used.

The STATA 16.0 software was used to these analyses.

Data collection

- Data was obtained from an experiment with food consumers in 2016-2017.
- Population consisted of people living in Aragon older than 18 years.
- Participants were recruited by the research team with the help of consumer associations, and public institutions (universities, technological centres, and town hall centres).
- A total of 18 sessions of around 12 participants were carried out.
- The final sample of 202 participants was stratified by age, gender, education level and province of residence.

Experiment description
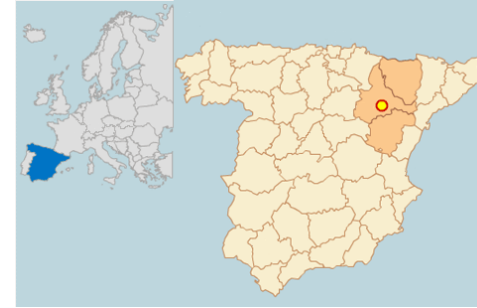
First part of the experiment

Participants were asked to answer the questions of objective knowledge of saffron after having observed 5 small flasks containing:

– high quality saffron in filaments

– low quality saffron in filaments

– safflower

– saffron in powder form

– artificial food colorant

1. En primer lugar, observe detenidamente las muestras e indique que producto de la lista cree que es cada una de ellas (Marque con una X).

	Muestra 1	Muestra 2	Muestra 3	Muestra 4	Muestra 5
Cártamo / Alazor					
Azafrán					
Cúrcuma					
Curry					
Pimentón					
Colorante alimentario					
No lo sé					

Second part of the experiment: hedonic liking

Participants should rate their liking of two saffron:

– high quality saffron (recent harvest) (1)
– low quality saffron (2)

•In filaments:

3.1. Muestra "1" (en hebra)

	Me disgusta muchísimo								Me gusta muchísimo
	1	2	3	4	5	6	7	8	9
Color									
Aroma									

•In water solution

4.1. Muestra "1" (infusión)

	Me disgusta muchísimo								Me gusta muchísimo
	1	2	3	4	5	6	7	8	9
Color									
Sabor									

Third part of the experiment: Ranking of labels

24. El azafrán que se vende suele llevar algunos de los siguientes logos que informan o certifican su proceso de producción y elaboración. Por favor, ordénelos de 1 a 5 en función de su preferencia donde 1 indica el más preferido y 5 el menos preferido.

| Denominación de Origen Protegida	Calidad Alimentaria de Aragón	Artesanía Alimentaria de Aragón	Agricultura Ecológica	Slow food

- Final questionnaire collected information on:
  - Food purchase and consumption habits
  - Saffron purchase and consumption habits
  - Socio-demographics and personal characteristics (food neophobia

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Results: sample

202

Gender (%)

Female 51.5 — Male 49.5
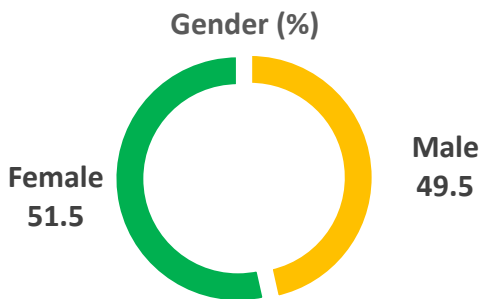
Household size (average, standard deviation) 2.7 (1.0)

Age (average and standard deviation)	46.2 (20.4)
18-44 years old	43.5
45-54 years old	15.8
More than 54 years old	40.6

Household monthly net income	
≤1,500	22.8
1,501–2,500	21.8
2,501–3,500	18.3
>3,500	10.4
Do not know/refuse to answer	26.7

Education attained	
Primary	23.8
Secondary	48.0
Higher	28.2

18.3 %

69.3 %

12.4 %
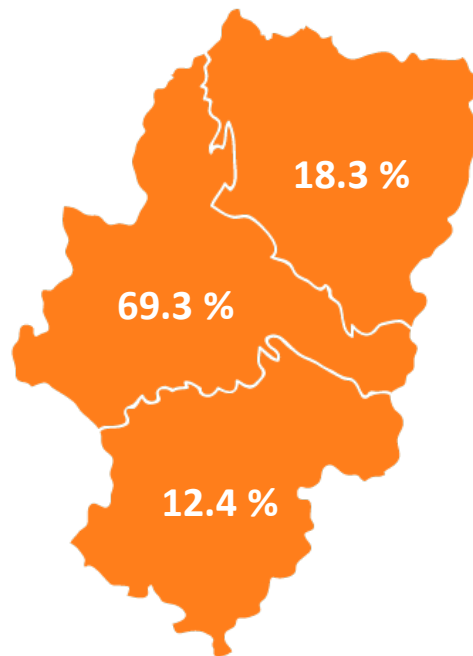
Importance of saffron attributes: percentage and ranking means

Labels	Rank #1 [a]	Rank #2	Rank #3	Rank #4	Rank #5	Mean ± SD [b]
Organic production	34.7	18.1	21.1	23.6	2.5	2.4 a ± 1.2
Protected Designation of Origin (PDO)	22.6	26.6	25.1	19.1	6.6	2.6 a ± 1.2
Alimentary quality of Aragón (C'ALIAL)	21.6	24.1	20.1	22.6	11.6	2.8 a ± 1.3
Alimentary Craftsmanship from Aragón	18.1	28.6	28.7	20.6	4.0	2.6 a ± 1.1
Slow Food	3.0	2.5	5.0	14.1	75.4	4.6 b ± 0.9

Results: estimation

Estimates of the mixed rank-ordered logit

Labels	Mean [a]		SD [b]	
	β'_n Coefficient	Z-ratio	β'_n Coefficient	Z-ratio
Organic production	2.6673	10.10 ***	0.8780	3.23 ***
Protected designation of origin (PDO)	2.4328	9.94 ***	0.8811	3.33 ***
Alimentary quality of Aragón (C'ALIAL)	2.2223	9.21 ***	1.1738	4.68 ***
Alimentary Craftsmanship from Aragón	2.3912	10.74 ***	0.0570	0.10

Slow Food label used as a reference

The importance given to these four labels was statistically higher than the importance attached to the Slow Food label used as a reference. **Organic – PDO - Alimentary Craftsmanship – C'ALIAL.**

Consumer preferences for the **Organic, PDO and C'ALIAL** labels were **heterogeneous**.
Consumer preferences for the **Alimentary Craftsmanship** label were **homogeneous**.

Results: heterogeneity

Four groups were obtained from the cluster analysis (k-means)

| Labels, respondents proportion, and cluster designation	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Statistic test [a] (*p*-value)
Organic production [b]	2.9243 a	2.8950 a	2.2587 b	2.3554 b	68.53 (0.00) ***
Protected designation of origin (PDO) [b]	2.5434 a	1.8399 b	2.8276 c	2.4551 a	102.08 (0.00) ***
Alimentary quality of Aragón (C'ALIAL) [b]	1.4884 a	2.4262 b	2.5190 b	3.0902 c	257.74 (0.00) ***
Alimentary Craftsmanship from Aragón [b]	2.3899 a	2.3907 ab	2.3896 a	2.3913 b	3.62 (0.01) **
Respondents belonging to each cluster (%)	36.7	22.1	21.1	20.1	
Cluster designation	Organic lovers little interested in C'ALIAL	Organic lovers little interested in PDO	PDO lovers	C'ALIAL lovers	

Consumer characteristics [a]	Cluster 1 Organic lovers little interested in C'ALIAL	Cluster 2 Organic lovers little interested in PDO	Cluster 3 PDO lovers	Cluster 4 C'ALIAL lovers	Statistic test [b] (*p*-value)
Socio-demographic characteristics (%)					
Gender: female	41.1	61.4	42.8	70.0	11.61 (0.00) ***
Education level: university degree	38.4	18.2	28.6	22.5	6.42 (0.09) *
Income level: >3,500 €/month	16.5	2.3	11.9	7.5	6.35 (0.09) *
Saffron knowledge: recognition after visual and olfactory inspection (%)					
High quality	60.3	43.2	78.6	50.0	12.48 (0.00) ***
Hedonic preferences: overall liking of saffron after observing, smelling and tasting (average) [c, d]					
High quality	6.4 a	5.6 b	6.0 ab	5.7 ab	2.60 (0.05) *
Saffron use: users (%)	76.7	90.9	83.3	62.5	10.76 (0.01) **
Saffron use: dishes where saffron is used (%)					
Legumes and vegetables	8.9	15.0	31.4	12.0	8.59 (0.03) **
Rice dishes other than paella	55.4	47.5	80.0	60.0	8.90 (0.03) **
Provided information in the label (average)					
Importance of harvest year	4.2 a	3.8 ab	3.9 ab	3.7 b	2.71 (0.05) *
Food consumption motives (average) [d, e]					
Importance of not expensive food	3.7 ab	3.5 a	3.6 ab	4.1 b	2.51 (0.06) *
Food neophobia (average) [d, f]					
I am constantly sampling new and different foods	3.5 ab	3.7 a	3.6 ab	3.1 b	2.35 (0.07) *
I like foods from different countries	3.8 a	4.0 a	3.9 a	3.3 b	3.52 (0.02) **
Ethnic food looks too weird to eat	2.2 a	2.3 ab	2.1 a	2.8 b	3.12 (0.03) **
I like to try new ethnic restaurants	3.9 a	3.8 ab	4.0 a	3.4 b	2.56 (0.06) *
Remarkable characteristic of the cluster	High-education level and income	Saffron user	Saffron connoisseur	Female low user	

Conclusions

- The most preferred labels were: the EU organic logo and the PDO.

- Consumers value more the quality labels that are regulated by the EU.

- Consumer preferences for these labels were heterogenous.
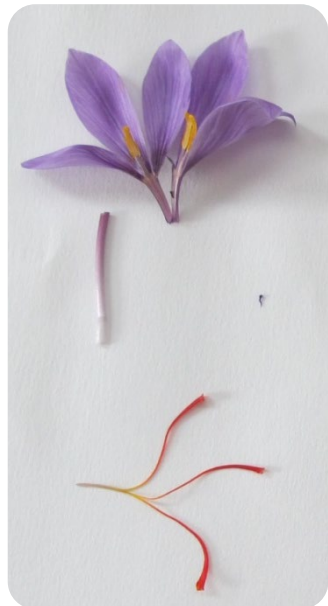
Consumer clusters	Organic lovers little interested in C'ALIAL	Organic lovers little interested in PDO	PDO lovers	C'ALIAL lovers
Remarkable characteristic	High-education level and income	Saffron user	Saffron connoisseur	Female Low user

Sustainability via biodiverse agri-food value chains

THANK YOU FOR YOUR ATTENTION

Ana María Sánchez , Cristina Mallor and <u>Azucena Gracia</u>