


# Characterization of the gastronomy of the city of Córdoba: Demographic influence

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## Abstract

Córdoba's gastronomy is characterized by the excellency of the typical dishes found in this city. Based on the above, a survey of the population has been promoted to permit us to obtain information on the recognition of 11 traditional dishes in Córdoba's cuisine, along with their frequency and place of consumption, discriminated per sex, age groups, social stratum and geographical location. The influence of the survey method (by interviewer and on-line) was also studied. The questionnaire consisted of 32 questions divided into 3 sections. The first was on the classification factors of the interviewee, the second on the identification and assessment of the traditional Córdoba dishes, and, finally, there was a section to establish the frequency and place of the consumption of each dish. Thus, 1509 surveys were made in which the most typical Córdoba gastronomy dishes were identified: "salmorejo" by 96% of the interviewees, "flamenquín" by 84% and oxtail by 73%. Also, it was also possible to find out that *salmorejo* and *flamenquín* are mainly consumed in homes during the whole year, whereas oxtail is consumed less frequently and, generally, when receiving guests from outside Córdoba. For each question asked, the effect of the demographic factors of classification was verified by  $\chi^2$  tests. The validity of on-line surveys for this type of study has been recognized provided that factors like the proportionality of sex and the provenance of the interviewees are controlled.

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**Keywords:** Survey; Gastronomy; Cordoba; Traditional recipes; *Salmorejo*; Oxtail

## Introduction

Córdoba was the Ibero-American Capital of Gastronomic Culture in 2014, which brought the city to the fore with regard to distinctive elements of its Gastronomic Culture. These were enhanced in different events and activities, although some key elements related to what are considered its most emblematic and traditional dishes were not completely established. Diverse initiatives are being carried out in private associations and gastronomic guilds and in public institutions like Córdoba University. To this effect, for the past ten years, the “Cofradía Gastronómica del Salmorejo Cordobés” has been holding annual symposia on this famous dish, which has triggered abundant bibliography on its ingredients from a nutritional, historical, sensorial and gastronomic point of view ([Galán Soldevilla et al., 2011, 2012; 2013](#); [Moreno-Rojas et al., 2014](#)).

The traditional food identifying a city or a region is very often more than a generalization that can cover a variety of recipes, as can occur with rice in Valencia (paella), or, in the case of Córdoba, where in every restaurant and every home they prize themselves on having the best *Salmorejo* or Oxtail recipe, which offers a highly interesting plurality but creates a conceptual confusion, especially for a visitor to the city who finds different culinary preparations responding to one same name. This enormous heterogeneity of recipes should be harmonized in a single concept, as has been the case of the standardization of the Córdoba *salmorejo* ([Moreno-Rojas et al. 2009](#), [Moreno Rojas et al., 2016a,b](#)), which has permitted its translation into many languages ([Cofradía Gastronómica del Salmorejo Cordobés, 2015](#)), or to incentive creativity with regard to varieties ([Consejo regulador de la Denominación de Origen Estepa, 2017](#)). This is happening with other dishes like oxtail, which has already been standardized ([Moreno-Rojas et al., 2017](#)). But this is no more than a first step towards a process of the characterization of differentiated quality, as in the case of rice in Valencia, where the Generalitat of Valencia has created “traditional paella of Valencia with the Designation of Origin “Rice of Valencia”, whose characterization has been qualified on several occasions ([Conselleria d’Agricultura, Pesca i Alimentació, 2010, 2013](#)).

However, in the process of granting a quality-guaranteed label to any food, or of characterizing the gastronomy of any locality or region, it is necessary to find out the gastronomic reality of the food or its location. Then it is possible to identify to what extent a certain dish merits a special gastronomic consideration in one area with respect to others, that could also be considered as traditional or typical, its valuation in the general population of the area studied, and above all how much it is consumed. This last point is of special interest since, in some places, traditional dishes were identified that are now only consumed at certain times of the year (seasonal consumption) and especially by the older population, so that except for recovering them in documents, they are food dishes in danger of extinction. In this direction, the European Institute for Mediterranean Food, through its Gastronomy Library, has compiled 100 traditional dishes for each Andalusian province (800 in all), that includes some gastronomic archaeological remains under the title “Recovering the Gastronomic Memory of Andalusia” ([IEAMED \(Instituto Europeo de Alimentación Mediterránea\), 2017](#)). In it there are some recipes and anecdotes, but the reality about the consideration and consumption of those dishes at present remains to be seen.


This study aimed to determine the degree of recognition by the population of Córdoba of 11 food dishes that could be considered as being traditional in its gastronomy, establishing elements like their consumption and location frequency, discriminating per sex, age, social stratum and geographical situation. Simultaneously, it was intended to estimate the differences produced by conducting a survey either person-to-person or by an on-line system.

## Material and methods

First, several meetings were held with experts in Córdoba's gastronomy (Andalusian Chair of Gastronomy, restaurant and chef associations, bloggers and food journalists) to select the dishes that they considered to be most typical of Andalusian gastronomy. 10 were chosen, to which one more was added that, although it is consumed in Córdoba, had not been identified as being traditional; this was to establish whether it had some influence for the mere fact of including it in the survey ([Table 1](#)).

alt-text: Table 1

Table 1

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Description of the dishes included in the survey.

**Salmorejo** is a vegetable cream (tomato and garlic), completed with bread, extra virgin olive oil and salt. The ingredients are crushed until a smooth cream is formed. It is usually accompanied by hard-boiled egg and serrano or iberian ham. It is consumed cold.

**Flamenquín** is a meat and ham roll that is coated with breadcrumbs and fried in very hot olive oil. It is usually served with chip potatoes (fries).

**Oxtail** is a stew made with the tail of the bull (or cow) cooked for a long time to turn its connective tissue, that is abundant in this anatomical area, into gelatine, that makes the tail tender and the dish tastier. It is cooked with vegetables (like carrot, tomato, onion, garlic) olive oil and spice. It is usually served not boned, garnished with thick shaped fried potatoes.

**Pastelón** is a flaky pastry tart filled with “angel hair” (preserved shredded pumpkin) cooked in the oven and sprinkled with sugar and cinnamon.

**Perol** is a rice dish cooked traditionally with chopped tomato, green pepper, garlic and some kind of meat and is first fried lightly in olive oil. Then, wine, water and saffron are added and while it is boiling, the rice is added. It is left to simmer until tender and the rice has usually absorbed all the water. It is cooked in a deep utensil similar to a frying pan with two handles called *perol*, which gives its name to the dish. It is a familial and festive food that is usually consumed in the open air directly from the *perol* (with no plates).

**Caracoles** (*Helixaspersa* and other species), these snails are simmered in water with a mixture of garlic, onion and other spices. They are highly appreciated and consumed in the spring, mainly in street stalls exclusively selling this product.

**Aubergines** These are egg-plants eaten dusted with flour and fried in abundant, very hot olive oil. They are sometimes garnished with cane honey.

**Migas**, can be made in different ways in Spain but in Córdoba they consist of bread cut into small pieces and soaked in water. It is strained and sautéed (usually in a *perol*) in olive oil with garlic, garlic sausage and bacon. They are usually served with fresh orange quarters.

**Cogollos** are a small variety of lettuce, which is sliced longitudinally in 2 or 4 parts (according to their size) and seasoned with salt, vinegar and olive oil in which small pieces of garlic have been fried which, when cooled, is poured over the lettuce.

**Japuta** (*Brama brama*) Pomfrets are poor quality fish with little flavour and they are cut in pieces and marinated in vinegar, olive oil, paprika and garlic for at least 1 h. They are strained, coated with flour and fried in abundant, very hot olive oil. They are usually eaten with mayonnaise.

**Carne and Embutido de Caza.** Game meat and sausages refer mainly to the meat of free-roaming species, specifically deer (*Cervuselephus*) and boar (*Sus scrofa*), whose meat is generally cooked in the same way as oxtail and is also served with fried potatoes. The sausages made from these species are garlic and salami-type sausages and they usually contain a mixture of game meat and fat from domestic pigs.

The questions in part of the questionnaire were designed to include those with respect to the socio-demographic classification of the interviewees, those concerning the actual way the survey was being administered, and, of course, those referring to the consideration of the traditional dishes and the frequency and place they were consumed (at home or in a catering establishment).

A mock survey was carried out on degree students in Food Science and Technology at Córdoba University and their family context to verify that all the questions were well understood by the interviewees, at the same as serving as training for the interviewers.

The questionnaire was uploaded to Google Drive so that the survey could be completed directly on an electronic device (mobile phone, tablet or computer).

The survey contained 32 questions, grouped in 3 sections. The first one, 4 questions, corresponded to the classification of the interviewees by sex, age group, location of domicile (for social classification) and the way in which the survey was being answered (person to person, email, Whatsapp, etc.). A second section of 6 questions referred to identifying the traditional dishes and making a ranking of them in order to assess their preferences, aside from their being more or less typical of Cordoba gastronomy, then they were asked openly to point to a dish that ought to have been considered as being typically from Córdoba and included in the survey. The last section of 22 questions was focused on consumption frequency and where they consumed each dish.

By taking some demographic data, derived variables were obtained, such as in the case of place of residence, that permitted the creation of a dichotomic variable between the residents and non-residents in Córdoba city, and, in turn, to assign a social stratum to the interviewees on the basis of their distribution per district or area of the city. This was done by the City Council of Córdoba in collaboration with the Spanish National Research Council ([García Rodríguez et al., 2010](#)).

The survey was conducted in two ways: person to person, by trained interviewers, and on-line. To select the sample for the personal interviews, the population pyramid of Córdoba was taken, discriminating by sex and

ages (Ayuntamiento de Córdoba, 2013), along with the allocation of districts in Córdoba to assign the social strata. In this way, a sampling system was established based on 700 samples classified by quotas.

The on-line surveys were distributed using the social networks or disseminated by means of the principal gastronomic bloggers of Córdoba.

In all, 1509 surveys were made, 717 by interviewers with a selection per quotas and 792 on-line (self-administered and self-completed).

The results of the surveys were grouped and refined in MS-Excel, and their subsequent statistical study was performed with SPSS v.20 applying the  $\chi^2$  test to the contingency tables created.

## Results

Of the total surveys made, 583 corresponded to men and 926 to women, although, as will be explained later, in the person-to-person surveys the number was more balanced and proportional to the population pyramid of Córdoba.

Age groups of each 10 years were established except for the group under 20 years (which really corresponded to the ages of 18 and 19), and that of over 70. These two groups of cohort extremes present a smaller number of interviewees as corresponds to their demographic profile.

Of the total surveys, 76% corresponds to residents in Córdoba city, 11% was from towns in the province, 9% from other provinces of Andalusia, 3% from other autonomous communities and under 1% resided outside Spain. Within Córdoba city, practically all the districts were represented although their representation was not homogeneous.

Based on the districts of residence (only in Córdoba city) a distribution in social strata was made, giving three groups: “Upper”, with 249 interviewees (corresponding to the classification strata *High* and *Medium-High*); “Intermediate”, with 264 (exclusively *Middle* stratum); and “Inferior”, with 584 interviewees (corresponding to the strata *Low* and *Middle -Low*). This re-grouping was done to homogenize the sampling sizes since, especially the *Low* stratum and, to a lesser extent the *High* one, were represented in a smaller proportion. The distribution per social stratum corresponds to the typology of Córdoba society.

Next, the statistical results of the total surveys obtained are presented in those aspects most relevant to the survey. To estimate the effect of the different factors  $\chi^2$  tests have been made ( $P < 0.05$ ).

### Relationship between classification factors

Before addressing the effects of the different sociodemographic factors on the responses from the interviewees, we checked whether there was any interaction between the actual classification factors (Table 2).

alt-text: Table 2

Table 2

**i** The presentation of Tables and the formatting of text in the online proof do not match the final output, though the data is the same. To preview the actual presentation, view the Proof.

p-value and significance obtained by  $\chi^2$  tests of the interaction between classification factors for the frequency of response in the survey.

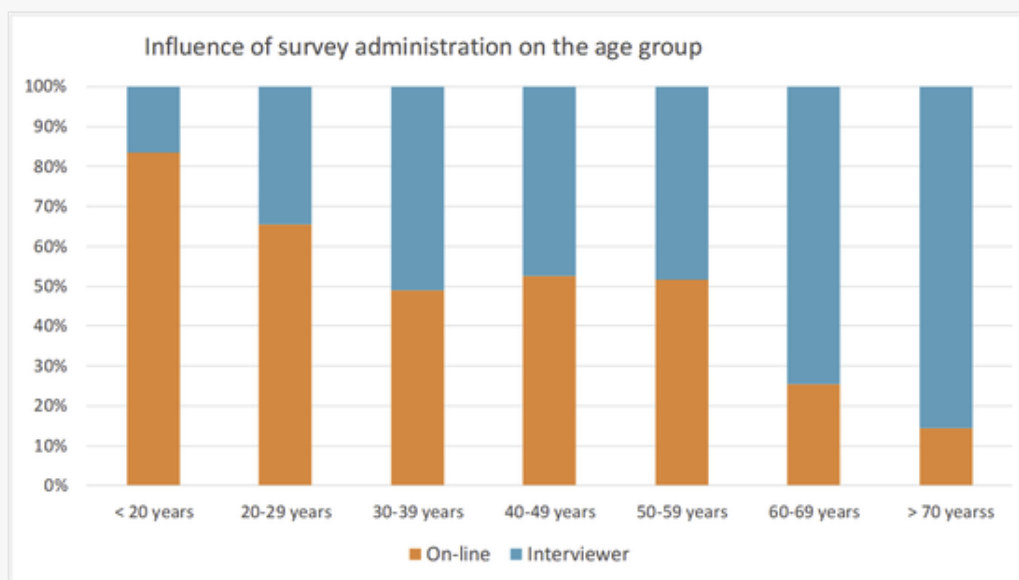
Factors		p- $\chi^2$	p-value
Survey method	Age group	3.41E-41	***
	Social class	1.07E-01	ns
	Place of residence	4.96E-27	***
	Sex group	2.63E-02	*
Sex group	Age group	3.73E-06	***
	Social class	1.52E-04	***
	Place of residence	4.17E-02	*
Age group	Place of residence	1.45E-22	***

ns: non-significant; \*p-value < 0.05; \*\*p-value < 0.01; \*\*\*p-value < 0.001.

In Fig. 1 it can be seen how the response method of the survey had an influence on the age group ( $P < 0.001$ ), which was to be expected, since young people use informatics systems more than older people. Accordingly, a decline can be seen in the on-line survey as from those under 20 (maximum use) up to the 30–39 group in which it becomes stable until it falls again as from 60 to 69, with minimums starting from 70 years.

alt-text: Fig. 1

**Fig. 1**



The relationship between the social class and the survey administration method is not shown. However, there does exist a strong relationship between those residing in Córdoba or not, and the administration method ( $P < 0.001$ ). This result is logical since 85% of the non-residents were found on-line, whereas there were only 46% of residents by this method. Or, expressed in another way, 95% of the person to person interviews correspond to residents in Córdoba city, as was predicted.

With regard to sex, the  $\chi^2$  test displays an association with respect to the survey method ( $P < 0.05$ ), showing itself to be well-balanced (58% of women in person to person interviews and 64% on-line). This result is framed within what is expected, since gastronomic subjects are habitually more frequented in internet by women than by men.

A relationship is evidenced between the place of residence and the sex of the interviewee ( $P < 0.05$ ), possibly influenced by the way the survey was conducted that was related to both, given that the percentage of non-resident women is slightly higher (67%) than that of the residents (60%).

Although a relationship is noted between sex and age group ( $P < 0.05$ ), it is circumscribed to the group of over 60s, in which the number of men diminishes, which is to be expected according to the population pyramid, although the use of internet by the men (INE (Instituto Nacional de Estadística), 2018) is slightly greater at those ages.

No relationship between sex and residence was noted ( $P > 0.05$ ), but there was one between sex and social class ( $P < 0.01$ ) with a lesser frequency than that expected of men of the intermediate and upper classes, whereas there is a greater presence of low-class women. This association disappears if the sample of people interviewed personally is reduced from the effect of the sampling system per quota.

A strong relationship is evidenced between age group and residence ( $P < 0.001$ ) due to the scant presence of non-residents aged over 60, from the effect mentioned of an inferior use of internet by the older men (15).

It is not possible to estimate the relationship between social group and residence since the non-residents could not be assigned a social group.

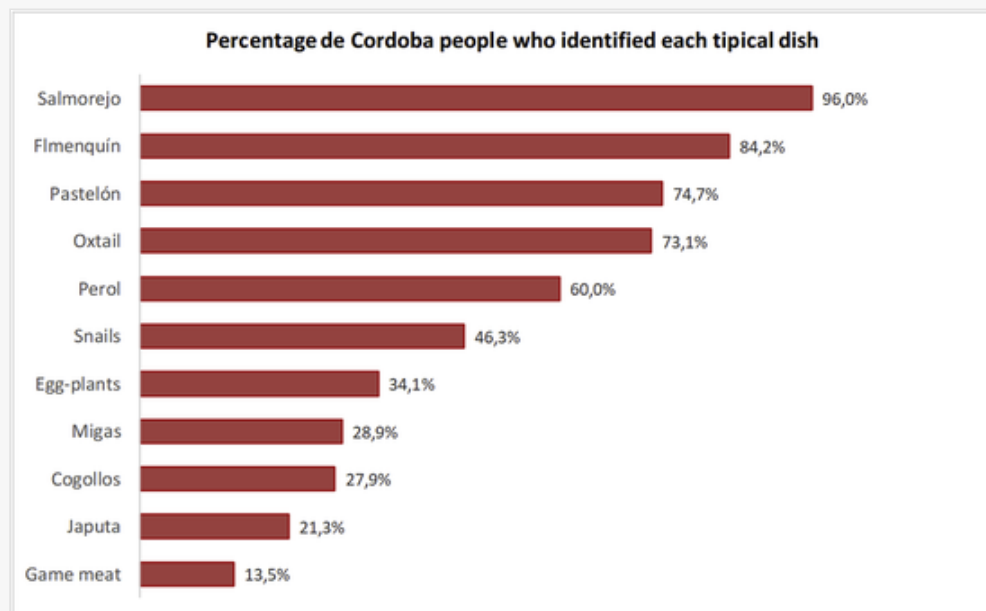
### **Dishes that can be considered as being traditional ones in Córdoba**

The survey included a question for the interviewees to freely vote for which of the 11 dishes they considered typical of Córdoba (with multiple choice), but, given the complexity of the results, the effect of different demographic factors could not be evaluated statistically. However, Fig. 2 shows the percentages of interviewees who elected each of the dishes, *salmorejo* being in the majority (96% of the interviewees), and, almost testimonial, game meat and its products, which was not really among the dishes chosen by the experts and was included as a control element. Even so, over 13% of the interviewees voted for them simultaneously with other dishes, because in effect they are present in Córdoba cuisine. In the open question with which they could indicate some dish that they considered typically from Córdoba and which had not been included in the

survey, there were few responses and none of them reached 1% in the interviewees. Thus, we believe that the dishes studied are those most representative of Córdoba gastronomy.

alt-text: Fig. 2

Fig. 2



Percentage of interviewees who elected each of the dishes in the survey as being traditional in Córdoba cuisine.

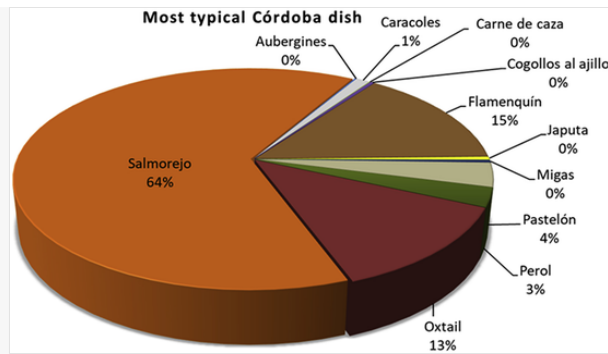
## The most typical dish

The following question was formulated so that they could decide which one dish was the most emblematic one. This was again determined by means of  $\chi^2$  tests to find out whether the different classification factors studied affected the choice of dishes, but not doing so for any of the factors studied ( $P > 0.05$ ). Thus, Fig. 3 depicts the distribution of dishes elected homogeneously by the interviewees. As can be seen, *salmorejo* was chosen by 64%, *flamenquín* by 15% and oxtail by 13%. The rest of the dishes were hardly mentioned except for *pastelón* (4%) and the Córdoba *perol*. This distribution raises two issues: on one hand the possible effect contributed by the activities and associations around each dish, which in the case of *salmorejo* have already been mentioned in studies and activities (1–7). In the case of *flamenquín* and oxtail some of those activities do exist although with a lesser repercussion. It can be assumed that those initiatives could maintain the presence of these dishes in the collective awareness. But, on the other hand, we have discovered the order of preference of the dishes on which efforts should be focused to establish a differentiated quality for the benefit of the city itself and its tourism. After these results, we decided to concentrate the statistical evaluation of the frequency and place of the consumption on those three principal traditional dishes.

alt-text: Fig. 3

Fig. 3





Percentage of votes obtained for each dish as being the most typical one.

## Dish preference

In the following question the interviewees were asked which of the dishes proposed was the one they liked most. In this question the  $\chi^2$  tests did establish interactions. In the case of between men and women ( $P < 0.05$ ), the highest proportion of the women preferred snails (*caracoles*) (over twice the number of men), but, conversely, a higher proportion of men preferred oxtail, or game meat products. No differences were noted in the rest.

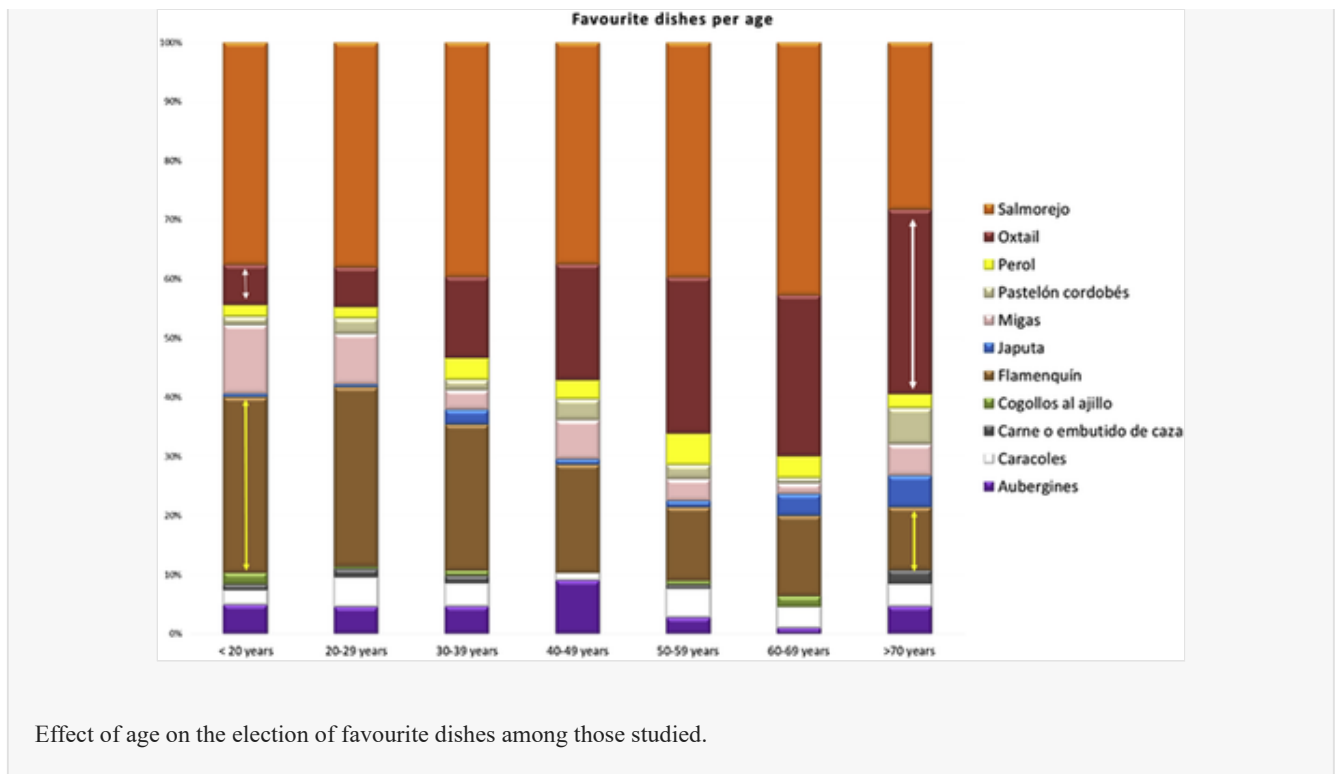
There was also an interaction with the type of administration of the survey, mainly in the consumption of snails and oxtail (possibly influenced by the proportion of sexes), and *flamenquín*, which was the one most voted for in the on-line interviews.

Residence in Córdoba, or not, also presented an interaction with the election of preferred dishes ( $P < 0.05$ ), with an increase in the preference for *salmorejo*, egg plants, lettuce with garlic and *flamenquín* in non-residents standing out and the opposite for snails, *japuta*, *migas*, *perol* and oxtail.

The age group interacted on the favourite dish chosen, as is shown in Fig. 4, in which there is mainly a highly marked fall in the preference for the *flamenquín* and an increase for oxtail as the interviewees became older. The rest of the dishes remain more constant in the time or undergo variations with no clear trend. This effect was also recognizable, although with less intensity, in the choice of the most typical dish but, as indicated, it was not significant ( $P > 0.05$ ).

alt-text: Fig. 4

Fig. 4



Effect of age on the election of favourite dishes among those studied.

Fig. 4 depicts the generic distribution of the dish preferences of the interviewees, from whom it was concluded that, again, *salmorejo*, *flamenquín* and oxtail were among those preferred, but at percentages closer to each other than for the question referring to the most typical dish. A greater presence of dishes that had not been considered as being the most typical ones was also noted, i.e. fried egg plants, or snails.

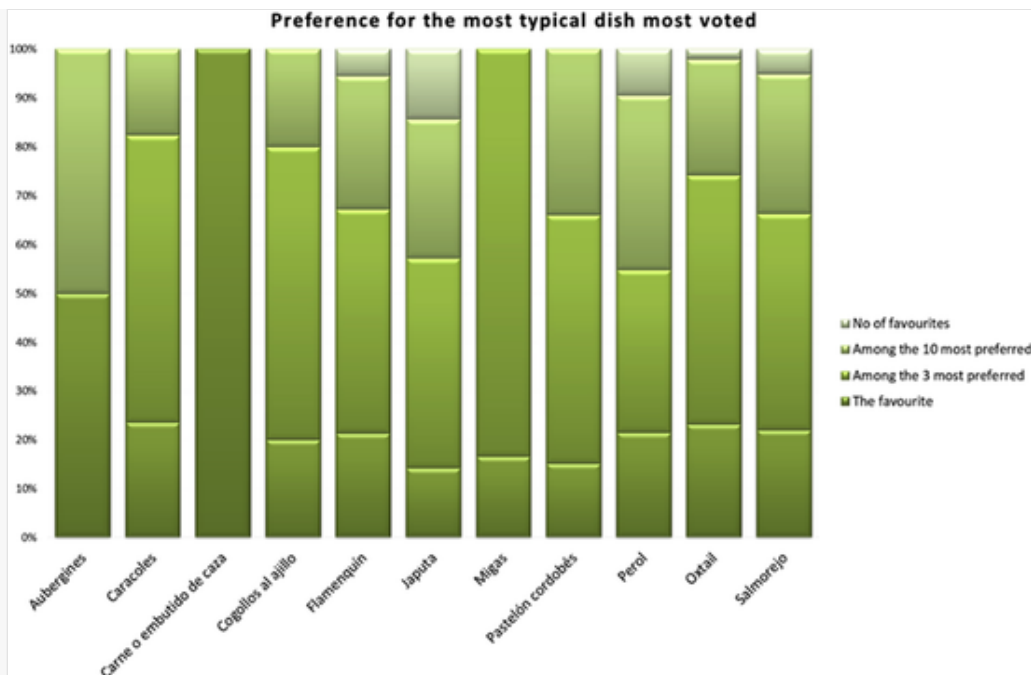
### Level of preference for the most typical dish

In the following question, they were given a chance to classify the dish that they had voted as being the most typical one in one of the following categories in relation to their preferences: their favourite, among the three most fancied, among the ten favourite ones, or outside the preference scale. This variable is not affected ( $P > 0.05$ ) by the factors studied (survey administration, residence in Córdoba, sex, age or social stratum).

In Fig. 5 it can be observed that, independently of the number of people who elected as being typical one dish or another, the percentages of its predilection are well distributed. Namely, they do not select the dish for their personal preferences but because they really consider that is a gastronomic reference in the city. One exception to this rule is game meat, that was only elected by those who put that it was their favourite dish, which justifies the fact that, despite not being one of the 10 dishes initially voted for as being typical of Córdoba, may reach a small percentage of votes as being most typical. This effect is possibly produced due to hunters and their milieu, who express a great preference for this type of food, thus making their consumption of it much greater than that of the rest of the population (Sevillano Morales, 2013).

alt-text: Fig. 5

Fig. 5



Level of preference for dishes elected by the interviewees as being the most typical ones.

### Consumption frequency and places

The participants were asked how frequently they consumed each dish, and, in the case of food that was more seasonal (*salmorejo*, snails and game meat), the frequency of consumption either during the season or all the year was noted. In another question, the principal consumption place of each dish (home or outside) was investigated. The answers to these two questions are displayed for the three dishes identified as being most representative of Córdoba gastronomy: *salmorejo*, *flamenquín* and oxtail (Table 3).

alt-text: Table 3

Table 3

*i* The presentation of Tables and the formatting of text in the online proof do not match the final output, though the data is the same. To preview the actual presentation, view the Proof.

p-value and significance obtained by  $\chi^2$  tests of the interaction between consumption frequency and places with classification factors for the three dishes identified most representative of Córdoba gastronomy.

Factors		<i>Salmorejo</i>		<i>Flamenquín</i>		Oxtail	
		p $\chi^2$	p-value	p $\chi^2$	p-value	p $\chi^2$	p-value
Frequency	Survey method	2.03E-07	***	9.01E-05	***	4.32E-07	***
	Age group	5.16E-12	***	1.34E-02	*	5.61E-29	***
	Social class	5.72E-01	ns	4.17E-01	ns	4.87E-02	*

	Place of residence	5.86E-04	***	1.62E-05	***	3.33E-07	***
	Sex group	1.22E-01	ns	2.07E-03	**	1.02E-01	ns
Consumption place	Survey method	2.95E-04	***	1.53E-01	ns	6.61E-01	ns
	Age group	1.82E-01	ns	2.40E-03	**	3.03E-03	**
	Social class	4.76E-02	ns	7.52E-01	ns	9.71E-03	**
	Place of residence	2.69E-03	**	8.53E-04	***	2.03E-01	ns
	Sex group	1.70E-01	ns	7.04E-01	ns	3.41E-01	ns

ns: non-significant; \*p-value < 0.05; \*\*p-value < 0.01; \*\*\*p-value < 0.001.

**[Instruction: It is a subsection of the "Consumption frequency and places" section.]Salmorejo**

Only 7% declared that they never consumed *salmorejo*. Its most habitual consumption frequency was weekly during the summer, followed at a distance by interviewees who consumed it monthly all year round. However, this frequency was affected by the factors studied. For instance, the survey administration model and being a resident in Córdoba influenced a higher consumption frequency ( $P < 0.001$ ) in the summer, daily, weekly and monthly by those who answered the person to person survey, and, on the contrary, a higher occurrence of those who never consumed it among those who answered the survey on-line. The age interacted with the consumption frequency of *salmorejo* ( $P < 0.001$ ), with a greater consumption as the age increased being shown, although a moderate one. Neither the social scale nor the sex affected the consumption frequency of *salmorejo* ( $P > 0.05$ ).

*Salmorejo* is largely consumed at home (92% of the consumers of this dish), although those interviewed personally, or those who are residents in Córdoba, consume it at a higher proportion at home ( $P > 0.001$  for both cases) reaching 94% in residents compared to 88% those who are not, with similar percentages between person to person interviewees and those on-line. No interaction appeared in sex, age group or social stratum with the consumption place of *salmorejo* ( $P > 0.05$ ).

**[Instruction: It is a subsection of the "Consumption frequency and places" section.]Flamenquín**

This is not consumed seasonally so that, in the consumption frequency voting options, it is not differentiated between the season and rest of the year. Only 2% of the interviewees never eat *flamenquín*, its habitual consumption being monthly (54%). However, the form of administering the survey and being or not resident in Córdoba affected the answers ( $P > 0.001$  for both) with the consumption frequencies being higher in those interviewed personally and the residents. However, in the on-line surveys and in non-residents those who seldom consumed it increased. The percentage of those who never consumed it is identical regardless of the way the survey was conducted, but it was greater in non-residents. Sex affects the consumption frequency of *flamenquín* moderately ( $P < 0.01$ ), with the consumption increasing monthly in men and occasional consumption in women. Similarly, the age of the interviewees affects the consumption frequency ( $P < 0.05$ ) causing small changes, although curious ones, like the fact that weekly and monthly percentages coincided in the under 20 group with those of groups between 30 and 59, possibly due to family cohabitation; those weekly

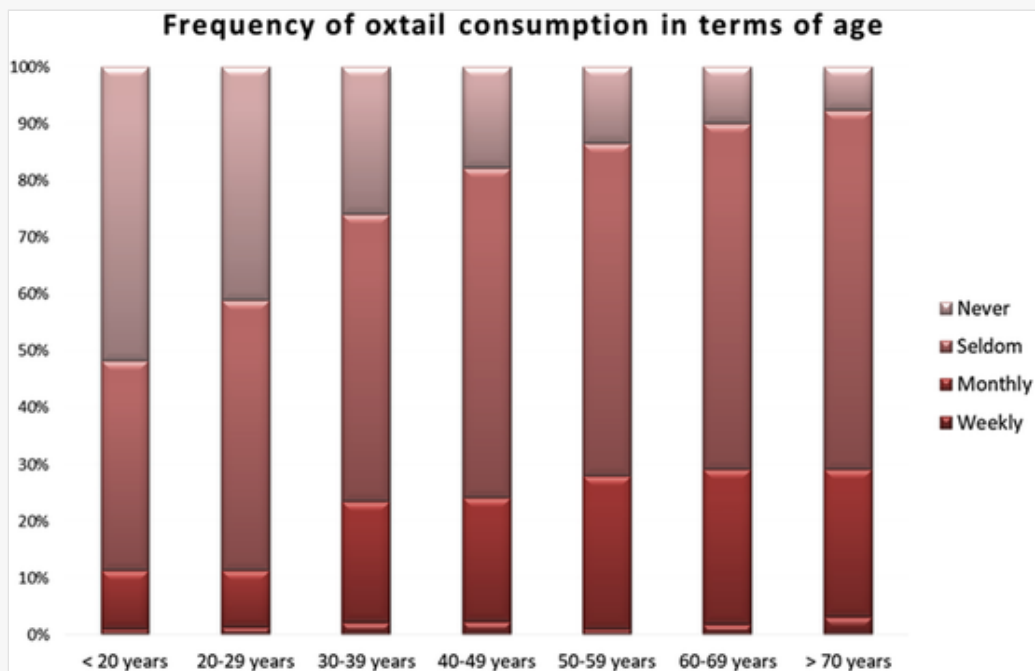
consumptions being lower and the monthly ones higher than those from 20 to 29 age group and those of over 60. The social stratum did not produce any interaction with the consumption frequency of *flamenquín* ( $P > 0.05$ ).

The *flamenquín* is mainly consumed at home (72%) and is affected by the fact of not being a resident of Córdoba ( $P < 0.001$ ), when its consumption at home decreases to 63%. The age group is affected ( $P < 0.01$ ) but only in the group of over 70 years, whose consumption at home increases to 82%, whereas the two groups containing ages of between 40 and 59 years reduce it to 65%. The rest of the factors studied were not significant ( $P > 0.05$ ).

### **[Instruction: It is a subsection of the "Consumption frequency and places" section.]Oxtail**

Oxtail is consumed sporadically (53%) with a large number of interviewees answering that they never consumed it (25%), and its weekly consumption is almost anecdotal (2%) and nobody admits to eating it daily. In the question on the consumption frequency of all the dishes, it was distinguished between seldom consumed and a special case of infrequent consumption but when some person visits Córdoba. Generally, in other dishes, this last option was not voted very much, so that it was added to sporadic consumption not specified for the calculations of the statistics calculations. However, for oxtail, the number of people answering that they only consume it when they have visitors from outside Córdoba rises to 11% of the interviewees (mainly Córdoba residents). This demonstrates that it is a dish that Córdoba people use as an emblem of their gastronomy despite its consumption frequency being scant. In any case, to keep up the system applied to the other dishes, the non specific occasional consumption referring to visitors is grouped in a single item. Being a dish that requires a lot of time to prepare, and not being on many menus outside Córdoba, it is noted that both the residence factor and the survey method affect its consumption frequency ( $P < 0.001$ ). This happened especially in the interviewees who answered that they never consume the dish, giving an increase in incidence in those who did the survey on-line (30%), as well as in the non residents in Córdoba 40%, whereas this dropped to 20% in the person to person survey and hardly affected the residents (23%). Strangely enough, the sex of the interviewee does not affect the consumption frequency ( $P > 0.05$ ), in spite of, both in the ranking and in preference, women expressed less predilection for this dish than men. Possibly fact of consuming this dish more sporadically and that it was usually done as a couple or in the family, conditioned the consumption frequency so that it was similar for both sexes. However, the indications of favouritism declared for this dish per age group were fully demonstrated its consumption ( $P < 0.001$ ), with the number of interviewees who never eat oxtail decreasing with age (52% in the youngest, 8% in the oldest), as can be seen in [Fig. 6](#). This evolution denotes a reduction tendency in the consumption of this dish in the future, when the generational change arrives, notice of which should be taken if it is wished to keep it as an emblem of Córdoba gastronomy. The social stratum affects the frequency of oxtail consumption ( $P < 0.05$ ), but only with regard to the monthly consumption which drops from the upper (27%) to the lower (20%) classes, with this trend being inverted in sporadic consumption. The time needed to cook it and the price that oxtail is acquiring both raw and cooked, would seem to have an effect on the social strata with a lesser purchasing power.

Fig. 6



Distribution of the consumption frequencies of oxtail in terms of age.

68% of oxtail consumption occurs outside the home, which would seem logical as it is a dish with a greater elaboration, with a large number of ingredients and long cooking times (traditionally, around 3 h) with occasional supervision to prevent its sauce from drying up. The consumption proportion in and outside the home is affected by age ( $P < 0.01$ ), so that the youngest and oldest people answering the survey present a higher consumption at home, whereas in the intermediate ages they reached 73% of consumption in catering establishments. Likewise, the social stratum affects the place that oxtail is consumed ( $P < 0.01$ ) giving that in only 63% of cases the lower class consumes it outside the home (due to their lower purchasing power), and, curiously the intermediate stratum is that giving a higher percentage (74%) of consumption outside the home (which could be because they have less time to cook it). The rest of the factors considered do not affect the consumption distribution in or outside the home of oxtail ( $P > 0.05$ ).

## Conclusions

It is necessary to characterize the typical gastronomy of a territory by studying consumption, preference and consideration of its most emblematic foods. With this information, it is possible to act on preserving, improving, recovering or establishing a certified quality value.

In the case of the gastronomy of Córdoba, there are three food dishes that rise above the rest, as much for being considered within the characteristic gastronomy, as for being designated by some consumers as the most typical dishes, and even for being consumption preferences. These are: *salmorejo*, *flamenquín*, and oxtail.

*Salmorejo* is the one best characterized bibliographically and on which most events are organized. It is considered by 96% of the population as a constituent of Córdoba gastronomy, by 64% as the most typical dish

in the area and 38% considers it as their favourite dish (with more votes from the non residents of Córdoba). This dish is mainly consumed at home (92%) with a weekly frequency during the summer and monthly the rest of the year, with a greater consumption by residents in Córdoba and as they get older.

The *flamenquin* is considered as being a Córdoba gastronomy dish by 84% of the population, although only 15% think that it is the most typical one, and 21% voted for it as their favourite dish, with, the younger the interviewee, this last percentage increasing. It is consumed monthly (54%) especially among residents, but somewhat less in those who are not. Women consume it more sporadically and by ages the lowest consumption is in the fringe from 30 to 59 years and those under 20. It is a dish consumed at home (72%) although this percentage decreases in non residents and rises in those aged over 70.

Oxtail is identified in Córdoba gastronomy by 73% of the population, although only 13% points to it as being the most typical one and 18% considers it to be their favourite dish, although in a lower percentage in the youngest interviewees. However, 11% of the interviewees consume it only on the occasion of a visit from relatives of outside Córdoba, and an average of 25% of the interviewees answered that they never consumed it, a percentage which rose to 40% in non residents and that, the same as its preference, is maximum at younger ages (52%), with the number of non consumers declining with an increase in age down to 8% in people of over 70. In general terms, this dish is consumed sporadically (53%) and mainly outside the home (68%), which is modulated by age, residence in Córdoba or not, and the social class to which the interviewee belongs.

On the whole, a high coincidence has been demonstrated between the responses obtained person to person and those on-line, the bias being principally attributable to controllable factors like, place of residence, sex and age, since the surveys on-line have been answered most by non residents, not very old women, which are factors that are verified as affecting the results obtained in the same sense as the way the survey was administered.

The introduction of a food that is initially not catalogued as being characteristic of Córdoba gastronomy has resulted in its being voted by some interviewees as if it was one. We confirmed that the latter precisely considered these products (game meat) as their favourites ([Sevillano Morales, 2013](#); [Sevillano Morales et al., 2018](#)), biasing their answers, but this did not occur with the rest of the foods included. This observation validates the effectiveness of the survey for the identification of dishes belonging to a concrete gastronomy.

## Proposals

It is clear that the predilection of Córdoba inhabitants for *salmorejo* and the degree of the evolution of its characterization, therefore, could be in an ideal situation to opt for some type of differentiated quality recognition.

Although oxtail has also initiated a characterization process, it has numerous handicaps, like its occasional and mainly domestic consumption, but above all a negative effect is observed on its consumption at younger ages, which, as the generational change takes place, could endanger its consumption and current prestige. In this case, it would be of more use to focus on promoting its consumption in young people, with alternatives like

boning it (the dish is usually served with its bones) or developing more efficient and faster culinary practices that reinforce its preparation and consumption in the home.

Finally, the *flamenquín* is a well-accepted and recognized dish that does not present such a complete characterization trajectory as the others. It is categorized as a pre-cooked food (floured and fried), which make it a type of food that is highly criticized in the “healthy food” context. Studies on oil uptake, with the use of extra virgin olive oil and optimal volume:surface ratio formats could improve its image for the sake of a future characterization.


## CRediT authorship contribution statement

**Rafael Moreno-Rojas:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Writing - original draft, Writing - review & editing. **Alicia Moreno-Ortega:** Data curation, Investigation, Software, Supervision, Validation, Visualization, Writing - original draft, Writing - review & editing. **Luis M. Medina-Canalejo:** Project administration, Resources, Supervision, Writing - original draft, Writing - review & editing.

## Declaration of competing interest

None.

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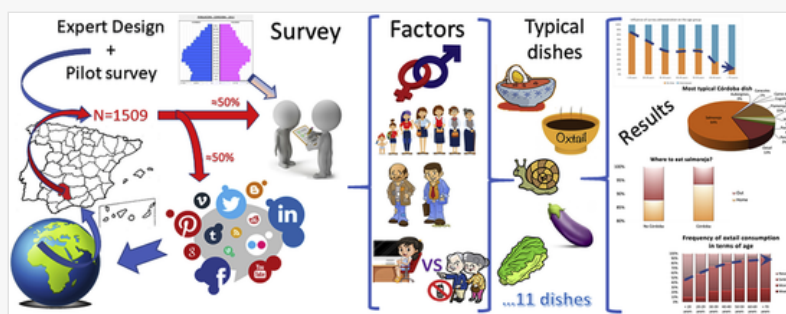
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## Graphical abstract

alt-text: Image 1



## Highlights

- *Salmorejo*, *flamenquín* and oxtail were identified as main characteristic dishes.
- *Salmorejo* was considered by 96% of the population as a component of Córdoba gastronomy.
- The *flamenquín* is consumed mainly at home (72%).
- 11% of the interviewees consume Oxtail only when be visit from outside Córdoba.
- This study allows acting to preserver, improve or establish a certified quality value.

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**Query:** The year in the first and second occurrence of Moreno Rojas et al., 2016 in the list has been changed to 2016a and 2016b.

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