

CHILDREN'S CONSUMPTION OF RABBIT MEAT

ESCRIBÁ-PÉREZ C.^{ORCID}, BAVIERA-PUIG A.^{ORCID}, MONTERO-VICENTE L., BUITRAGO-VERA J.^{ORCID}

Department of Economics and Social Sciences, Universitat Politècnica de València, 3B, Cno. de Vera s/n, VALÈNCIA, 46022, Spain.

Abstract: The nutritional and dietary properties of rabbit meat make it an ideal food for children, recommended by the World Health Organisation. However, the presence of children under 18 in the home has been found to decrease the frequency of rabbit meat consumption. If we focus on households with children under 18, 52.5% of minors do not consume rabbit meat. The main reason why children (intended as people under 18 yr old) do not consume rabbit meat is the fact that they do not like it (40.9%) and because it is not bought/eaten at home (30.9%). Faced with this situation, there is a pressing need to seek appropriate strategies to adapt rabbit meat for consumption by the youngest family members. In light of the results, the following strategies are proposed. First, the development of functional foods for babies and children, such as rabbit meat enriched with $\omega 3$ and docosahexaenoic acid. Secondly, improving meat tenderness. Third, adapting rabbit meat presentations for children (burgers, nuggets, sausages, marinades ...), converting them into convenience products for parents and extending their shelf life. Fourth, adapting the labelling/packaging for children to attract attention of both parents and offspring. Finally, developing communication strategies on the nutritional value of rabbit meat aimed at both children and parents. It is observed that if minors consume rabbit meat, they also eat other types of meat such as lamb and beef more often. Therefore, in this type of households a varied and complete diet is consumed in terms of meat consumption, so it would be necessary to rethink joint communication strategies among the three meat sectors. Promoting rabbit meat consumption among the under 18s has several consequences, as in the future they will be in charge of household purchases or share this responsibility.

Key Words: rabbit meat, beef, lamb, functional foods, convenience products, marketing strategy.

INTRODUCTION

Meat is an important source of protein, essential amino acids, B vitamins, minerals and other bioactive compounds (Nistor *et al.*, 2013). Meat consumption is highly recommended, as it favours development of body and cognitive functions in children and adolescents (Neumann *et al.*, 2007; Clayton *et al.*, 2009; Cofnas, 2018), as well as in babies (Engelmann *et al.*, 1998; Morgan *et al.*, 2004; Tang *et al.*, 2018). In particular, rabbit is recommended by nutritionists over other types of meat due to its nutritional and dietary properties. Rabbit meat is lean, rich in proteins of high biological value, with a low fat content and less saturated fatty acids and cholesterol than other meats (Hermida *et al.*, 2006; Hernández, 2008; Nistor *et al.*, 2013). For these same characteristics, its consumption has been recommended for children by the World Health Organisation (WHO) (Vergara *et al.*, 2005).

However, despite these favourable conditions, there has been a decrease in *per capita* consumption in the Mediterranean in recent years (Petracci *et al.*, 2018), especially among the younger population segments (González-Redondo and Contreras-Chacón, 2012). This situation is worrying, as the Mediterranean region has been always characterised by its culinary penchant for rabbit, which frequently features in celebratory dishes and local specialties (Kallas and Gil, 2012; Petracci and Cavani, 2013). Although there have been several studies on rabbit meat consumption in Spain (Kallas and Gil, 2012; Buitrago-Vera *et al.*, 2016; Escribá-Pérez *et al.*, 2017), we found no specific studies on rabbit

Correspondence: A. Baviera-Puig, ambapui@upv.es. Received June 2019 - Accepted August 2019.
<https://doi.org/10.4995/wrs.2019.11991>

meat consumption in children. So, the aim of this research is to analyse rabbit meat consumption among the under 18s (0-18) in order to propose different courses of action. An in-depth analysis of this market segment may provide new opportunities for the rabbit sector, given its current critical and complex situation (Cullere and Dalle Zotte, 2018).

MATERIALS AND METHODS

Data collection

We carried out a telephone survey in peninsular Spain, covering the whole Spanish territory except the Balearic Islands, Canary Islands, Ceuta and Melilla. The CATI (Computer Assisted Telephone Interview) system was used. The phone numbers were selected at random from public telephone directories. Geographically, Spain was divided into Nielsen areas (Santesmases, 1996). The selected consumer profile is responsible for food purchasing in homes where meat or meat-based products are bought at least once every 2 mo. Their ages ranged from 25 to 75 yr. The field work was carried out in the first 2 wk of June 2014. As only 5 yr have passed and there have been no major changes in the sector, we believe that the behaviour patterns have not changed. Nor has any other survey of this type been carried out by the sector since then.

The sample size was 800 interviews, for an error of $\pm 3.53\%$ and a confidence level of 95.5%. The percentages of population with (p) and without the studied characteristic (q) were considered 0.5, respectively, in order to calculate the sample size. The error was within the desirable limit of 4% indicated by Cea (2010) in social research. Before starting the analysis, the data were purged in a univariate scanning procedure by means of a frequency table. The result was the detection of 55 cases in which some data were missing. As this figure did not exceed 10% of the total number of cases (Malhotra, 2008), we assumed that the presence of these cases was totally random. Once they were ruled out, we were left with a total of 745 valid cases.

Statistical analysis

Different analyses were performed. First, we used basic statistics and frequency distributions to describe the data. Second, cross-tabulations were developed to differentiate the different types of households analysed. On one hand, we compared households with and without children under 18 and, on the other, we compared households where children consumed rabbit meat with those households in which children did not consume it. Third and finally, an ANOVA was performed to compare the average consumption frequency of each of the types of meat analysed: beef, chicken, pork, lamb, turkey and rabbit. This mean frequency was obtained from the consumption frequency scale considered (once a week, once a fortnight, once a month, once every 2 or 3 mo, once a year, no consumption), from 1 to 6, respectively. Thus, an average frequency around 1 means that the respondent consumes this type of meat once a week or more, i.e. very often. This equivalence has been applied in previous studies (Escribá-Pérez *et al.*, 2017). The ANOVA was carried out both for households with and without children under 18 yr of age, and in households in which minors consumed and did not consume rabbit meat.

RESULTS AND DISCUSSION

Sample profile

Table 1 shows the sample characteristics. From the total sample, 30% are households with members under 18 yr of age. Both in households with and without children under 18, the woman is usually responsible for purchasing. In households with minors, the age of the person responsible for purchasing is mainly between 35 and 54 yr (76.2%), while in households without minors the age ranges from 55 to 74 yr (53.8%). Households with children under 18 are concentrated in the Northeast (17.0%), in the South (17.9%) and Barcelona (16.2%). In contrast, households without children under 18 are located mainly in the Centre (15.7%) and East (14.2%). The person responsible for purchasing in households with children under 18 yr of age usually has a formal education and, for the most part, FP2-Secondary education (FP is equivalent to Vocational Education and Training (VET)) and higher education (73.5%). Regarding the residential habitat, there were no significant differences between both types of households (with and without minors).

Table 1: Profile of the total sample and households with and without children under 18.

Variable	Homes with children less than 18 yr old (n=223)		Homes without children less than 18 yr old (n=522)		Sample total (n=745)	
	Frequency	%	Frequency	%	Frequency	%
Sex						
Male	67	30.0	127	24.3	194	26.0
Female	156	70.0	395	75.7	551	74.0
Age**						
Less than 25 yr old	0	0.0	0	0.0	0	0.0
25 to 34 yr	27	12.1	83	15.9	110	14.8
35 to 44 yr	102	45.7	62	11.9	164	22.0
45 to 54 yr	68	30.5	96	18.4	164	22.0
55 to 64 yr	17	7.6	139	26.6	156	20.9
65 to 74 yr	9	4.1	142	27.2	151	20.3
Geographic areas**						
North-east	38	17.0	59	11.3	97	13.0
East	24	10.8	74	14.2	98	13.1
South	40	17.9	51	9.8	91	12.2
Centre	18	8.1	82	15.7	100	13.4
North-east	27	12.1	68	13.0	95	12.8
North-central	23	10.3	66	12.7	89	12.0
Madrid	17	7.6	54	10.3	71	9.5
Barcelona	36	16.2	68	13.0	104	14.0
Studies**						
No studies	0	0.0	8	1.5	8	1.1
Primary	32	14.4	148	28.4	180	24.2
FP1-Secondary education	27	12.1	58	11.1	85	11.4
FP2-Secondary education	87	39.0	151	28.9	238	31.9
Higher education	77	34.5	157	30.1	234	31.4
Residence habitat						
<10 000 inhabitants	42	18.8	105	20.1	147	19.7
10 000 to 50 000 inhabitants	59	26.5	131	25.1	190	25.5
50 001 to 100 000 inhabitants	32	14.4	60	11.5	92	12.4
100 001 to 500 000 inhabitants	52	23.3	135	25.9	187	25.1
>500 000 inhabitants	38	17.0	91	17.4	129	17.3
Household size**						
Interviewee only	0	0.0	46	8.8	46	6.2
Two	3	1.3	223	42.7	226	30.3
Three	50	22.4	114	21.9	164	22.0
Four	111	49.8	93	17.8	204	27.4
Five	37	16.6	35	6.7	72	9.7
>five	22	9.9	11	2.1	33	4.4

** Statistically significant at 99% confidence level.

FP2 = Vocational Education and Training (VET).

FP1 = a basic VET available in Spain.

Table 2: Rabbit meat consumption frequency in households with and without children under 18.

Frequency interval*	Homes with children under 18		Homes without children under 18		Sample total	
	Frequency	%	Frequency	%	Frequency	%
Once a week or more	30	13.5	123	23.6	153	20.5
Once every 2 wk	38	17.0	85	16.3	123	16.5
Once a month	30	13.5	69	13.2	99	13.3
Once every 2 or 3 mo	29	13.0	43	8.2	72	9.7
Once a year	15	6.7	25	4.8	40	5.4
Zero consumption	81	36.3	177	33.9	258	34.6
Total	223	100.0	522	100.0	745	100.0

* Statistically significant at 95% confidence level.

The size of the household is key when it comes to differentiating both types of household, as homes with children under 18 usually have three to five members (88.8%), and those without minors usually have two to three members (64.6%).

Child consumption analysis

The frequency of rabbit meat consumption in households with children under 18 yr of age is distributed as follows: 13.5% consume it once a week or more, 17% consume it once every 2 wk, 13.5% consume it once a month and 13% consume it once every 2 or 3 mo. In households without children under 18, 23.6% consume rabbit meat once a week or more, 16.3% consume it once every 2 wk, 13.2% consume it once a month and 8.2% consume it once every 2 or 3 mo (Table 2). For the intervals of highest consumption frequency (once a week or more and once every 2 wk), the number of households with children under 18 yr of age that consume rabbit meat (30.5%) is lower

Table 3: Rabbit meat consumption in households with children under 18.

Variable	Frequency	%
Yes	106	47.5
No	117	52.5
Total	223	100.0

Table 4: Reasons why children under 18 do not consume rabbit meat.

Reasons	Frequency	Total (%)	Sample (%)
They don't like it	45	39.8	40.9
Not purchase/not consumed at home	34	30.1	30.9
Is a baby/very young	5	4.4	4.6
They feel sorry (for the animal)	5	4.4	4.6
Lack of habit	4	3.5	3.6
Difficulty eating it	4	3.5	3.6
They don't want to try it	3	2.7	2.7
They have never been given it	2	1.8	1.8
Others	2	1.8	1.8
NS/NA	9	8.0	8.2
Total	113	100.0	102.7

NS/NA = Not Sure / No Answer.

compared to the number of households without (39.9%). For the intervals of lower consumption frequency (once a year and zero consumption), the number of households with children under 18 yr old (43.0%) is higher than the number of households without (38.7%). As there are significant differences ($P < 0.05$) between both types of households, we can conclude that the presence of children under 18 in the home reduces the frequency of rabbit meat consumption.

If we focus on households with children under 18, 52.5% of the children do not consume rabbit meat (Table 3). The reasons why children under 18 do not consume rabbit meat is mainly due to dislike (40.9%), because it is not bought/consumed at home (30.9%), the child is a baby or is very young (4.6%), they feel sorry (4.6%), lack of habit (3.6%) and difficulty of eating it (3.6%). The remaining responses did not reach 3% of the total sample. Being a multi-response question, the percentage is calculated on the total of answers (which totals 100%) and the percentage of the total of the sample (greater than 100%) (Table 4). The two first reasons concur with those noted by González-Redondo *et al.* (2010) among students from the University of Seville in Spain.

Given the high nutritional value of rabbit meat, parents should rethink the lack of habit of buying or consuming this type of meat and include it in the daily diet. Parents of children under 18 play a key role in the children's eating

behaviour. In addition to designing and buying the different foods that make up the household diet, they also exert their influence by encouraging their children to try new foods and force them to eat certain dishes (Patrick *et al.*, 2005; Jansen *et al.*, 2007). Bear in mind that, in general, children's food preferences do not usually coincide with a healthy diet, so it is essential to find the right strategies to get children to eat in a healthy and balanced way. Cooke and Wardle (2005) proposed, on the one hand, increasing the familiarity, availability and accessibility of healthy foods and, on the other hand, aiming messages appropriately to children.

The reason 'they feel sorry' are due to the rabbit's attributes related with its 'cuteness', perceiving them as pets. This cultural factor is not very relevant in Spain, as it represents only 4.6%, compared to the Anglo-Saxon countries where it is key (Petracci *et al.*, 2018). However, the current Spanish situation could change due to the ambivalent perception, as livestock and as a pet, detected among young Andalusians by González-Redondo and Contreras-Chacón (2012). The advantage of rabbit meat over other types of meat, such as pork or beef, is that it is not usually included in food restrictions due to religion. For this reason, we find no reason for non-consumption related to religion. As reported by Leroy and Degreef (2015), the social acceptance of the meat depends on its role in the cultural and religious identity of a community, so they represent fundamental reasons when deciding its consumption.

Relationship with consumption of other types of meat

In addition to rabbit meat, we also enquired about the frequency of consumption of the following meats: beef, chicken, pork, lamb and turkey. In Table 5, we can see how the meats most frequently consumed in households with and without children under 18 are chicken and beef. In contrast, the meats consumed less frequently in households with children are rabbit (3.91) and lamb (3.85), while in households without minors they are lamb (3.66) and turkey (3.60). In this case, the frequency of rabbit meat consumption has an average value of 3.56. In both cases, the average frequency of rabbit meat is between once a month and once every 2 or 3 mo. Next, we wanted to find out if there are significant differences in the average frequency of meat consumption if there is a presence of children under 18 at home or not. In other words, to determine whether the existence of minors in the household conditions the frequency of the type of meat consumed. The ANOVA carried out (Table 5) shows how, in households with children under 18, chicken and pork are consumed more frequently, but rabbit is consumed less frequently than in homes without children. These outcomes agree with those reported by Escribá-Pérez *et al.* (2017) when defining the consumer profile of each of the types of fresh meat in Spain. Thus, the presence of minors in the household determines the consumption frequency of the type of meat consumed.

If we analyse households with children under 18 yr of age where rabbit meat is consumed, compared to households with children where rabbit meat is not eaten (Table 6), the meats most frequently consumed in both cases are chicken, beef and pork. In households with children under 18 yr of age where rabbit meat is consumed, the meats less frequently consumed are lamb (3.33) and turkey (3.17). In this case, the consumption frequency of rabbit meat has an average value of 2.64 (average between once every 2 wk and once a month). In households with children under 18 yr of age where rabbit meat is not consumed, the meats less frequently eaten are rabbit (5.07) and lamb (4.32).

Table 5: Average frequency of meat consumption (A) whether there are children under 18 yr of age or not. Scale: 1=once a week; 2=once a fortnight; 3=once a month; 4=once every 2 or 3 mo; 5=once a year; 6=no consumption.

Type of meat	Homes with children under 18 (n=223)		Homes without children under 18 (n=522)		Significance
	A	SD	A	SD	
Beef	1.65	1.17	1.80	1.34	NS
Chicken	1.06	0.34	1.20	0.71	**
Pork	1.71	1.27	2.17	1.55	**
Lamb	3.85	1.69	3.66	1.58	NS
Turkey	3.33	2.12	3.60	2.16	NS
Rabbit	3.91	1.88	3.56	2.03	*

*Statistically significant at 95% confidence level.

**Statistically significant at 99% confidence level.

SD: standard deviation. NS: no significant.

Table 6: Average frequency of meat consumption (A) whether there are children who eat rabbit meat or not. Scale: 1=once a week; 2=once a fortnight; 3=once a month; 4=once every 2 or 3 mo; 5=once a year; 6=no consumption.

Type of meat	Homes with children who eat rabbit meat (n=106)		Homes with children who do not eat rabbit meat (n=117)		Significance
	A	SD	A	SD	
Beef	1.42	0.92	1.85	1.32	*
Chicken	1.06	0.41	1.06	0.27	NS
Pork	1.63	1.19	1.78	1.33	NS
Lamb	3.33	1.61	4.32	1.62	**
Turkey	3.17	2.01	3.47	2.21	NS
Rabbit	2.64	1.31	5.07	1.55	**

*Statistically significant at 95% confidence level.

**Statistically significant at 99% confidence level.

SD: standard deviation. NS: no significant.

The average for rabbit meat corresponds to once a year and zero consumption. It should be noted that, if minors do not consume rabbit meat at home, in general, they have a lower consumption of almost all meats (slightly higher average values). The exception to this statement is chicken, which shares the same average frequency (1.06), and rabbit meat, where the difference is much greater (2.64 vs. 5.07).

When performing the ANOVA (Table 6), we discovered that there are significant differences between both types of household in the consumption frequency of beef, lamb and rabbit. In homes where children consume rabbit meat, the consumption frequency of beef and lamb increases. In other words, if the minors consume rabbit meat, they also eat other types of meat such as lamb and beef more often. This information can be useful when carrying out joint campaigns of these three types of meats aimed at children, or a joint campaign for lamb and rabbit, given the situation of both sectors in Spain. According to data from MAPAMA (2018), lamb and rabbit are the meats with the lowest market share. On the one hand, lamb has a volume share of 4.3% of the total fresh meat. Demand for lamb

fell by 5.8% compared to 2016. In contrast, the drop in spending was not so abrupt (-2.2%). Lamb has a volume share of 3.3% of total fresh meat consumption. During 2017, rabbit meat showed a drop in volume (-5.5%). However, in terms of value it showed a growth of 2.2% caused by the increase in the average price, which went from € 5.23/kg in 2016 to € 5.65/kg (+8%) at the end of 2017.

When proposing common promotional campaigns, it would be interesting to analyse what attributes are steered by the different types of meat in the minds of consumers. Montero-Vicente *et al.* (2018) showed how chicken, turkey and rabbit meat presented a similar commercial positioning, due to the fact that they are healthy and low fat meats. To a lesser extent, beef is also associated with a healthy type of meat. Despite this similar positioning, no significant differences were observed in the average consumption frequency of turkey meat in both situations examined. Montero-Vicente *et al.* (2018) also showed how chicken and rabbit share an additional attribute in that they are 'economical'. However, this does not translate into a higher average consumption frequency of rabbit meat compared to other types of meat such as chicken (Tables 5 and 6). In contrast, Kallas and

Table 7: Benefits provided by rabbit meat to those under 18.

Benefits	Frequency	Total %	Sample %
Low fat	38	24.4	35.9
Healthy meat	26	16.7	24.5
Rich in proteins	18	11.5	17.0
Children like it	13	8.3	12.3
With many nutrients/nutritional	8	5.1	7.6
Rich in vitamins	7	4.5	6.6
Digestive/easily digestible	6	3.9	5.7
Delicious/tasty	4	2.6	3.8
Beneficial/Good for children	3	1.9	2.8
The same as for an adult	3	1.9	2.8
The same as other meats	3	1.9	2.8
Soft/tender	2	1.3	1.9
Quality meat	1	0.6	1.0
Others	7	4.5	6.6
Not Sure/No Answer	18	10.9	16.0
Total	157	100.0	147.3

Gil (2012) found that the price is the main limiting factor for consumption of rabbit meat among non-traditional or new consumers. Finally, the 'tasty' attribute is mainly associated with beef and lamb. Lamb is not associated with any other attribute (Montero-Vicente *et al.*, 2018). In short, the three types of meat (beef, rabbit and lamb) do not share any attributes based on the studies analysed. Finally, if intending to develop a promotion campaign in common, it could be done, for example, based on the importance of these three types of meat in rural Spain (Baviera-Puig *et al.*, 2017).

Opportunities for rabbit meat among children

The interviewees responded that the benefits of rabbit meat for those under 18 yr of age is that it is a meat low in fat (35.9%), healthy (24.5%), rich in proteins (17%), which children like (12.3%), nutritious (7.6%), rich in vitamins (6.6%), easily digested (5.7%) and tasty (3.8%). The remaining responses did not reach 3% of the total sample (Table 7). These results coincide with scientific studies on the benefits of rabbit meat (Vergara *et al.*, 2005; Hermida *et al.*, 2006; Nistor *et al.*, 2013). Therefore, we can deduce that the benefits of rabbit meat are known by the respondents but not by a large majority, given the percentages obtained. Although this meat is intrinsically characterised by its favourable nutritional composition, it can still be further improved by using the appropriate strategies (Cullere and Dalle Zotte, 2018; Petrescu and Petrescu-Mag, 2018).

On the one hand, it could be strengthened with bioactive compounds to obtain a meat considered functional, within the functional foods category, as rabbit diets can be very effectively manipulated to increase the levels of essential fatty acids (FA), ω 3 polyunsaturated fatty acids, conjugated linoleic acid, eicosapentaenoic acid, docosahexaenoic acid (DHA), branched chain FA, selenium or vitamin E. Moreover, enrichment of rabbit diets with different oils gives the meat better oxidative stability, adding functional ingredients, with the consequent nutritional benefits for humans (Cobos *et al.*, 1993; Hernández, 2008; Dalle Zotte and Szendrő, 2011). In the case of children, rabbit meat enriched with ω 3 and DHA could be developed, adapted to their needs for growth and development. On the other hand, differences in the tenderness of rabbit loin meat are more affected by genetic origin (Pla *et al.*, 1998). This feature is also very important so that children can eat it. Szendrő *et al.* (2016) carried out research in order to obtain lean meat for consumption and more fatty meat to improve the rabbit's energy reserves during production, as well as developing healthy and nutritious baby foods.

When asking those responsible for purchasing in homes with children under 18 yr old if it is interesting or not to create specific presentations (format, ways of presenting the rabbit, etc.) of rabbit meat for consumption by children, 34.9% considered it to be not at all interesting, or only slightly, while 47.6% considered it quite or very interesting. Some 14.4% considered it slightly interesting. However, there were no significant differences ($P=0.5072$) between households with children who do consume rabbit meat and those households with children who do not when answering this same question (Table 8). Even so, the percentage of people responsible for purchasing who consider it interesting can be attractive. As Cullere and Dalle Zotte (2018) proposed, the development of rabbit meat products adapted to different market segments could be a way to deal with the current difficult situation of the sector.

Table 8: Degree of interest in the creation of specific rabbit meat presentations for children.

Degree of interest	Homes with children who eat rabbit meat		Homes with children who do not eat rabbit meat		Total homes with children under 18	
	Frequency	%	Frequency	%	Frequency	%
Not at all interesting	19	17.9	25	21.4	44	19.7
Not very interesting	17	16.0	17	14.5	34	15.2
Slightly interesting	18	17.0	14	12.0	32	14.4
Quite interesting	31	29.3	43	36.7	74	33.2
Very interesting	18	17.0	14	12.0	32	14.4
Not Sure/No Answer	3	2.8	4	3.4	7	3.1
Total	106	100.0	117	100.0	223	100.0

Table 9: Types of rabbit meat presentations proposed for children.

Presentation type	Frequency	Total %	Sample %
Burgers	30	17.1	21.9
Nuggets	16	9.1	11.7
Deboned	9	5.2	6.6
Croquettes	7	4.0	5.1
In pieces/chunks	7	4.0	5.1
Sausages	6	3.4	4.4
Breaded fillets	5	2.9	3.7
Packaging with colours/cartoons	5	2.9	3.7
In paellas/with rice	5	2.9	3.7
Meatballs	4	2.3	2.9
Indicating recipes	3	1.7	2.2
Thighs	3	1.7	2.2
Fillets/loins	2	1.1	1.5
Inclusion in school menus	2	1.1	1.5
Others	9	5.2	6.6
Not Sure/No Answer	62	35.4	45.3
Total	175	100.0	128.1

The rabbit meat presentations proposed for children are burgers (21.9%), nuggets (11.7%), deboned (6.6%), croquettes (5.1%), in pieces or chunks (5.1%), in sausages (4.4%), breaded fillets (3.7%), coloured or patterned packaging (3.7%) and in paellas or with rice (3.7%). The rest of the responses did not reach 3% of the total sample (Table 9). The majority of the rabbit meat presentations proposed for children are for processed products. Products of this type have a series of commercial advantages, as they are characterised by a longer shelf life and high quality and food safety standards. In addition, they are convenience products (4th and 5th level type prepared products) ready to cook or ready to eat. Due to the transformation of consumption habits taking place in urban societies, these products are very interesting in terms of managing the diet at home to facilitate meal preparation (Dalle Zotte, 2002; Petracci and Cavani, 2013).

Currently, very few processed rabbit meat products are sold, such as burgers, fresh sausages, filled rolls and baby food. In recent years, these products have gained some ground in the market compared to conventional variants made with beef and pork (Mancini *et al.*, 2017). Nevertheless, there is still a broad technological margin for improvement in terms of rabbit meat convenience. In addition to designing new presentations not used so far (nuggets, croquettes, breaded fillets ...), the development of specific marinades can help counteract some of the problematic peculiarities of rabbit meat. The marinade produces a more tender product, with more flavour, fewer cooking losses and greater juiciness. Marinades are achieved by different processing techniques (Weiss *et al.*, 2010; Soglia *et al.*, 2014). This could be an interesting solution, as long as they are adapted to children's tastes.

One of the presentation proposals is "packaging in colours or with cartoons" (3.7%). An attractive label or container for children can influence the act of choosing by the person responsible for doing the shopping, either for themselves or at the request of the child under 18. To this could be added some sort of game that children could play by purchasing several units of the product. However, the proposed labelling or game should be supported by advertising plans that make them known (Bernués *et al.*, 2003). A good marketing strategy would be crucial to design and promote all the products posited (Font-i-Furnols and Guerrero, 2014; Buitrago-Vera *et al.*, 2016). In addition to designing ideal products for children, it would be necessary to set out the appropriate advertising strategy to present them with messages adapted to their own characteristics (Cooke and Wardle, 2005; Ilicic *et al.*, 2018). Television has been shown to exert a critical influence on children, as exposure to ads for food items not only enhances recognition but also promotes their consumption (Halford *et al.*, 2004; Wiecha *et al.*, 2006). Another option could be including rabbit meat in campaigns to promote health in children, either at school or in medical centres (Lea and Worsley, 2001; Dalle Zotte, 2002). We must not forget the important role played by parents in feeding their children, so the messages

of the communication strategy should also be directed at them, or else seek other means. For example, in addition to its nutritional and dietary properties, social media could be very useful to promote the culinary knowledge necessary to cook rabbit meat at home (Petracci *et al.*, 2018).

CONCLUSIONS

If the sector analyses the consumption habits of the different market segments, it will be able to adapt both the product (on the production and industry side) and the related communication (on the industry and interprofessional side) to each of them. The child segment may be very interesting for the rabbit industry, as the same product (rabbit meat) has unique nutritional and dietary properties, also for adults, and can be improved even further using the appropriate strategies. Promoting rabbit meat consumption among the under 18s has several consequences, as in the future they will be in charge of household purchases or share this responsibility. When this happens, if the children have habitually consumed rabbit meat, they will include it in their shopping list, they will know how to cook it, they will not see rabbits as pets and they will transmit these consumption habits to their children.

Acknowledgements: The authors give thanks to INTERCUN for its support for the research.

REFERENCES

- Baviera-Puig A., Buitrago-Vera J., Escribá-Pérez C., Montero-Vicente L. 2017. Rabbit meat sector value chain. *World Rabbit Sci.*, 25: 95-108. <https://doi.org/10.4995/wrs.2017.6565>
- Bernués A., Olaizola A., Corcoran K. 2003. Labelling information demanded by European consumers and relationships with purchasing motives, quality and safety of meat. *Meat Sci.*, 65: 1095-1106. [https://doi.org/10.1016/s0309-1740\(02\)00327-3](https://doi.org/10.1016/s0309-1740(02)00327-3)
- Buitrago-Vera J., Escribá-Pérez C., Baviera-Puig A., Montero-Vicente L. 2016. Consumer segmentation based on food-related lifestyles and analysis of rabbit meat consumption. *World Rabbit Sci.*, 24: 169-182. <https://doi.org/10.4995/wrs.2016.4229>
- Cea M.A. 2010. Métodos de encuesta. Teoría y práctica, errores y mejora. *Síntesis, S.A., Madrid, Spain.*
- Clayton E.H., Hanstock T.L., Watson J.F. 2009. Estimated intakes of meat and fish by children and adolescents in Australia and comparison with recommendations. *Br. J. Nutr.*, 101: 1731-1735. <https://doi.org/10.1017/s0007114508135887>
- Cobos A., Cambero M.I., Ordóñez J.A., De la Hoz L. 1993. Effect of fat-enriched diets on rabbit meat fatty acid composition. *J. Sci. Food Agric.*, 62: 83-88. <https://doi.org/10.1002/jsfa.2740620112>
- Cofnas N. 2018. Is vegetarianism healthy for children? *Crit. Rev. Food Sci. Nutr.*, <https://doi.org/10.1080/10408398.2018.1437024>
- Cooke L.J., Wardle J. 2005. Age and gender differences in children's food preferences. *Br. J. Nutr.*, 93: 741-746. <https://doi.org/10.1079/bjn20051389>
- Cullere M., Dalle Zotte A. 2018. Rabbit meat production and consumption: State of knowledge and future perspectives. *Meat Sci.*, 143: 137-146. <https://doi.org/10.1016/j.meatsci.2018.04.029>
- Dalle Zotte A. 2002. Perception of rabbit meat quality and major factors influencing the rabbit carcass and meat quality. *Livest. Prod. Sci.*, 75: 11-32. [https://doi.org/10.1016/s0301-6226\(01\)00308-6](https://doi.org/10.1016/s0301-6226(01)00308-6)
- Dalle Zotte A., Szendró Z. 2011. The role of rabbit meat as functional food. *Meat Sci.*, 88: 319-331. <https://doi.org/10.1016/j.meatsci.2011.02.017>
- Engelmann M.D.M., Sandström B., Michaelsen K.F. 1998. Meat Intake and Iron Status in Late Infancy: An Intervention Study. *J. Pediatr. Gastroenterol. Nutr.*, 26: 26-33. <https://doi.org/10.1097/00005176-199801000-00005>
- Escribá-Pérez C., Baviera-Puig A., Buitrago-Vera J., Montero-Vicente L. 2017. Consumer profile analysis for different types of meat in Spain. *Meat Sci.*, 129: 120-126. <https://doi.org/10.1016/j.meatsci.2017.02.015>
- Font-i-Furnols M., Guerrero L. 2014. Consumer preference, behavior and perception about meat and meat products: An overview. *Meat Sci.*, 98: 361-371. <https://doi.org/10.1016/j.meatsci.2014.06.025>
- González-Redondo P., Contreras-Chacón G.M. 2012. Perceptions among university students in Seville (Spain) of the rabbit as livestock and as companion animal. *World Rabbit Sci.*, 20: 155-162. <https://doi.org/10.4995/wrs.2012.1147>
- González-Redondo P., Mena Y., Fernández-Cabanás V.M. 2010. Factors affecting rabbit meat consumption among Spanish university students. *Ecol. Food Nutr.*, 49: 298-315. <https://doi.org/10.1080/03670244.2010.491053>
- Halford J.C.G., Gillespie J., Brown V., Pontin E.E., Dovey T.M. 2004. Effect of television advertisements for foods on food consumption in children. *Appetite*, 42: 221-225. <https://doi.org/10.1016/j.appet.2003.11.006>
- Hermida M., González M., Miranda M., Rodríguez-Otero J.L. 2006. Mineral analysis in rabbit meat from Galicia (NW Spain). *Meat Sci.*, 73: 635-639. <https://doi.org/10.1016/j.meatsci.2006.03.004>
- Hernández P. 2008. Enhancement of nutritional quality and safety in rabbit meat. In *Proc.: 9th World Rabbit Congress, 10-13 June, 2008. Verona, Italy*. 1: 1287-1300.
- Ilicic J., Baxter S.M., Kulczynski A. 2018. To Meet or Meat? Homophones in Advertising Encourage Judgments and Behaviors in Children. *J. Advert.*, 47: 378-394. <https://doi.org/10.1080/00913367.2018.1539361>

- Jansen E., Mulken S., Jansen A. 2007. Do not eat the red food! Prohibition of snacks leads to their relatively higher consumption in children. *Appetite*, 49: 572-577. <https://doi.org/10.1016/j.appet.2007.03.229>
- Kallas Z., Gil J.M. 2012. A dual response choice experiments (DRCE) design to assess rabbit meat preference in Catalonia: A heteroscedastic extreme-value model. *Br. Food J.*, 114: 1394-1413. <https://doi.org/10.1108/00070701211262984>
- Lea E., Worsley A. 2001. Influences on meat consumption in Australia. *Appetite*, 36: 127-136. <https://doi.org/10.1006/appe.2000.0386>
- Leroy F., Degreef F. 2015. Convenient meat and meat products: Societal and technological issues. *Appetite*, 94: 40-46. <https://doi.org/10.1016/j.appet.2015.01.022>
- Malhotra, N.K. 2008. Investigación de mercados, 5th ed. *Pearson Educación, Naucalpan de Juárez, México.*
- Mancini S., Preziuso G., Dal Bosco A., Roscini V., Paci G. 2017. Modifications of fatty acids profile, lipid peroxidation and antioxidant capacity in raw and cooked rabbit burgers added with ginger. *Meat Sci.*, 133: 151-158. <https://doi.org/10.1016/j.meatsci.2017.07.003>
- MAPAMA. 2018. Informe del consumo de alimentación en España 2017. Ministerio de Agricultura, Pesca y Alimentación. Available at: https://www.mapa.gob.es/images/es/informeanualdeconsumoalimentario2017_tcm30-456186.pdf. Accessed May 2019.
- Montero-Vicente L., Escribá-Pérez C., Baviera-Puig A., Buitrago-Vera J. 2018. Analysis of the commercial value of rabbit meat based on positioning of the different types of fresh meat. *Span. J. Agric. Res.*, 16: e0110. <https://doi.org/10.5424/sjar/2018163-13407>
- Morgan J., Taylor A., Fewtrell M. 2004. Meat Consumption is Positively Associated with Psychomotor Outcome in Children up to 24 Months of Age. *J. Pediatr. Gastroenterol. Nutr.*, 39: 493-498. <https://doi.org/10.1097/00005176-200411000-00009>
- Neumann C.G., Murphy S.P., Gewa C., Grillenberger M., Bwibo N.O. 2007. Meat Supplementation Improves Growth, Cognitive, and Behavioral Outcomes in Kenyan Children. *J. Nutr.*, 137: 1119-1123. <https://doi.org/10.1093/jn/137.4.1119>
- Nistor E., Bampidis V.A., PăfcalĂf N., Pentea M., Tozer J., Prundeanu, H. 2013. Nutrient Content of Rabbit Meat as Compared to Chicken, Beef and Pork Meat. *J. Anim. Prod. Adv.*, 3: 172-176. <https://doi.org/10.5455/japa.20130411110313>
- Patrick H., Nicklas T.A., Hughes S.O., Morales M. 2005. The benefits of authoritative feeding style: caregiver feeding styles and children's food consumption patterns. *Appetite*, 44: 243-249. <https://doi.org/10.1016/j.appet.2002.07.001>
- Petracci M., Cavani C. 2013. Rabbit meat processing: historical perspective to future directions. *World Rabbit Sci.*, 21: 217-226. <https://doi.org/10.4995/wrs.2013.1329>
- Petracci M., Soglia F., Leroy F. 2018. Rabbit meat in need of a hat-trick: from tradition to innovation (and back). *Meat Sci.*, 146: 93-100. <https://doi.org/10.1016/j.meatsci.2018.08.003>
- Petrescu D., Petrescu-Mag R. 2018. Consumer behaviour related to rabbit meat as functional food. *World Rabbit Sci.*, 26: 321-333. <https://doi.org/10.4995/wrs.2018.10435>
- Pla M., Guerrero L., Guardia D., Oliver M.A., Blasco A. 1998. Carcass characteristics and meat quality of rabbit lines selected for different objectives: I. Between lines comparison. *Livest. Prod. Sci.*, 54: 115-123. [https://doi.org/10.1016/s0301-6226\(97\)00179-6](https://doi.org/10.1016/s0301-6226(97)00179-6)
- Santesmases, M. 1996. Términos de marketing: Diccionario - Base de datos. *Ediciones Pirámide, Madrid, Spain.*
- Soglia F., Petracci M., Mudalal S., Vannini L., Gozzi G., Camprini L., Cavani C. 2014. Partial replacement of sodium chloride with potassium chloride in marinated rabbit meat. *Int. J. Food Sci. Technol.*, 49: 2184-2191. <https://doi.org/10.1111/ijfs.12531>
- Szendró Z., Kasza R., Matics Z., Donkó T., Gerencsér Z., Radnai I., Dalle Zotte A. 2016. Divergent selection for total body fat content of growing rabbits. 3. Effect on carcass traits and fat content of meat. *In Proc.: 11th World Rabbit Congress, 15-18 June, 2016. Qingdao, China.* 1: 791-794. <https://doi.org/10.4995/wrs.2014.1449>
- Tang M., Hendricks A.E., Krebs N.F. 2018. A meat- or dairy-based complementary diet leads to distinct growth patterns in formula-fed infants: a randomized controlled trial. *Am. J. Clin. Nutr.*, 107: 734-742. <https://doi.org/10.1093/ajcn/nqy038>
- Vergara H., Berruga M.I., Linares M.B. 2005. Effect of gas composition on rabbit meat quality in modified atmosphere packaging. *J. Sci. Food Agric.*, 85: 1981-1986. <https://doi.org/10.1002/jsfa.2181>
- Weiss J., Gibis M., Schuh V., Salminen H. 2010. Advances in ingredient and processing systems for meat and meat products. *Meat Sci.*, 86: 196-213. <https://doi.org/10.1016/j.meatsci.2010.05.008>
- Wiecha J.L., Peterson K.E., Ludwig D.S., Kim J., Sobol A., Gortmaker S.L. 2006. Impact of Television Viewing on Dietary Intake in Youth. *Arch. Pediatr. Adolesc. Med.*, 160: 436-442. <https://doi.org/10.1001/archpedi.160.4.436>