

A perspective of the Portuguese consumer awareness, beliefs and preferences towards piglet castration methods and its implications on the meat quality

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Abstract. Neutering male piglets by surgical procedures without anaesthesia, with analgesia and/or anaesthesia and, recently, immunological-chemical castration are practices to avoid unwanted or aggressive sexual behaviour, and to prevent the development of meat boar taint. This exploratory study aims to investigate Portuguese consumer's awareness, beliefs and attitudes in issues like boar taint, piglet's castration and pork meat quality, observing possible demographic trends. It is also intended to identify clusters of consumers with similar attitudes, crossing them with demographic data to verify the existence of patterns in Portugal related to these issues. To attain this objective, a consumer's survey was performed through an online questionnaire open for 30 days. A total of 158 respondents completed the survey. Almost a half (46%) of respondents stated their unknowledge about boar taint. Surgical castration and its effects are topics with which older consumers with a rural background are more familiar with, while immunological-chemical castration is still unknown to most consumers: 65% of consumers said they were not aware of this method, and 75% did not know whether it is an effective method for eliminating boar taint. Hierarchical clustering followed by K-means analysis segmented consumers into three clusters characterized according to their opinions, mainly divided by ethical and chemical-free orientations and by a more conservative meat quality and flavour-oriented attitudes, generally independent of prevailing demographics. In general, there were no defined opinions about the subjects under study, due mainly to the lack of information or knowledge. Nevertheless, cluster classification revealed differences in consumer's opinions, especially regarding the reasons for castration and the pain inflicted, about meat quality and the willingness to buy pork from entire males or to pay more for this type of product.

Key words: boar taint, consumer perception, entire male pigs, immunocastration, surgical castration.

INTRODUCTION

Castration of male piglets is a procedure to prevent the development of boar taint in the meat of entire male pigs, and has been a traditional practice for ages and is still common in most countries (Bonneau & Weiler, 2019). This practice also makes it easier to handle the pigs, as castrates exhibit less aggressive and sexual behaviour than entire males (Font-i-Furnols et al., 2019).

Boar taint is an unpleasant odour often described as a sharp ‘animal’, ‘urine’, ‘faecal’ or ‘sweat’ like, which can be perceived when pork is cooked or eaten warm (Mathur et al., 2012), being an off-flavour that is mainly caused by the accumulation of two compounds: androstenone and skatole. Androstenone (5 α androst-16-en-3-one) is a steroid produced in the testis, sensorially associated with the smell of urine, and skatole (3-methylindol), which has a stable-like smell, is a metabolite derived from the amino acid tryptophan produced in the lower gut by intestinal microbiota (Claus et al., 1994). Due to the lipophilic characteristics of these compounds, redistribution from blood to fat tissue is easily occurring with prolonged accumulation in fat tissues (Aldal et al., 2005; Wauters et al., 2016). Levels of skatole are lower in castrates and gilts than in entire male pigs and, although the mechanism has not been completely elucidated (Aldal et al., 2005), it is known that androstenone interferes with skatole clearance by the liver (Doran et al., 2002; Whittington et al., 2004).

Scientific research on animal welfare began because of ethical concerns over the quality of life of animals. Animal welfare concept can be defined by three ethical concerns: the quality of life of animals (animals should lead natural lives through the development and use of their natural adaptations and capabilities), its emotional state (that animals should feel well by being free from prolonged and intense fear, pain, and other negative states, and by experiencing normal pleasures), and its ability to express their normal behaviours (Fraser et al., 1997). In recent years, surgical castration of male piglets has become a welfare concern due to the pain and stress associated with this procedure. Until the 1980s it was wrongly assumed that new-borns could feel almost no pain, and this long-prevailing scientific view is the main reason why castration of male piglets is still carried out without pain treatment or anaesthesia (von Borell et al., 2020).

In European Union, the pork production chain and welfare-concerned citizens have demanded a ban on surgical castration without pain relief, and a number of European stakeholders committed themselves to stop surgical castration by 2018 through the European Declaration on Alternatives to Pig Castration (EC, 2010), if satisfactory solutions were found to the various challenges associated with the abandonment of this practice. However, currently none of the available alternatives are fully satisfactory: the deadline ended officially on 1 January 2018, and the European pork chain is still resisting the change, with some stakeholders considering that castration of male piglets without pain relief is not an issue (Bonneau & Weiler, 2019). There have been no new commitments on the part of the EU institutions to renew the declaration. The opinions on this issue and its practicability are widely dispersed: although countries using analgesia/anaesthesia routinely found this method practical and effective, only few countries seem to aim at meeting the deadline to phase out surgical castration completely (De Briyne et al., 2016).

Many farmers still consider methods to replace surgical castration without pain control unnecessary, ineffective, costly, or impractical. In some countries, the use of pharmacological tools requires the involvement of a veterinarian, which acts as a barrier

to the adoption of pain mitigation (Hötzel et al., 2020). There are currently three possible alternatives with practical relevance: surgical castration with anaesthesia and or analgesia, raising entire males, and immunocastration (Weiler & Bonneau, 2019). Also, genetic advances on boar taint reduction have shown that it is possible to reduce boar taint in few generations (Duarte et al., 2021). Other options, such as sperm sexing to produce only females, the injection of chemical compounds into the testes to destroy the tissue or the administration of exogenous hormones to inhibit the hypothalamic pituitary-gonadal axis cannot be realistically considered (Bonneau & Weiler, 2019).

The use of anaesthesia or analgesia during surgical castration is one of the current alternatives, having the advantage of the prevention of quality problems due to boar taint or changes fatty acid composition with the carcasses being suitable for all traditional pork products, but the downside is the risk of post-surgical wound infections and higher feed consumption compared with boars (Weiler & Bonneau, 2019). Application of analgesia is demanded by several quality assurance programs in Belgium, Germany and France, and some countries have a longer tradition of using anaesthesia during castration, such as Norway, Sweden and Switzerland, while this practice is recent in Denmark and will be introduced in Germany by 2021 (Aluwe et al., 2020).

Raising entire male pigs presents some economic advantages as boars have generally leaner carcasses and less feed is needed in order to achieve the same final weight when compared to castrates, whereby the environmental impact is lower (Morlein et al., 2015; Wauters et al., 2017; Bonneau et al., 2018). Furthermore the lower lipid content and the higher content of unsaturated fatty acids in adipose tissues of entire males (Škrlep et al., 2020) may be regarded as favourable from the human dietetic point of view (EFSA, 2004). The disadvantages of raising entire males include the risk of boar taint, the difficulties in managing the restless entire males, the lower meat quality in relation to the reduced intramuscular fat content and increased fat unsaturation, which is detrimental for processing dry-cured products (Bonneau & Weiler, 2019). Production of boars is common in Spain, Portugal, Ireland, and United Kingdom, and since 2010, introduced in countries like the Netherlands, Belgium, and France (De Briyne et al., 2016; Aluwe et al., 2020).

Immunocastration or vaccination against anti-gonadotropin releasing hormone (GnRH) is performed by giving two injections with a gonadotropin releasing factor (GnRF) analogue-protein conjugate with at least 4 weeks apart, with the second vaccination at least 4 weeks before slaughter (Heyrman et al., 2019), and is sometimes used as an alternative to eliminate boar taint without the need for surgical castration. However, immunocastration is carried out later in life during the fattening stage and farmers are given a longer time span to apply it, and consumers could be sceptical about food safety and prices (Kress et al., 2019). Also, the available vaccine (Improvac®, Zoetis), is catalogued by the EU in the therapeutic area of sex hormones and modulators of the genital system (EMA, 2020), which limits its use in organic production systems. Outside Europe, immunocastration has been used on a large scale during the last two decades in Australia and New Zealand, and most recently in Brazil. In Europe, it is applied to 5 up to 10% of the male piglets in a number of countries, but its development is being slow, based on assumed rejection of the practice by the consumers (Bonneau & Weiler, 2019; Aluwe et al., 2020).

Consumer attitudes and beliefs are mainly determined by price, taste, health and convenience (Font-i-Furnols et al., 2019). Attitude can be described as a learned

pre-disposition to respond in a consistently favourable or unfavourable manner with respect to a given object, and is typically viewed as a latent or underlying variable that is assumed to guide or influence behaviour (Fishbein & Ajzen, 1975), and beliefs are the cognitive knowledge related to information that an individual has about something that can be linked to some attribute, action or event. Consumer knowledge regarding piglet castration is generally low but a higher number of consumers are aware of organic production (Font-i-Furnols et al., 2019). Different methodologies are used via face-to-face or online surveys to evaluate consumer acceptability: alternatives for surgical castration evaluation of the acceptability or assessing the willingness to pay for meat and meat products are used to measure the perception of piglet castration (Aluwe et al., 2020). Some studies using focus groups or online surveys regarding consumer attitudes towards surgical castration of piglets have been reported from specific countries or regions such as Norway (Fredriksen et al., 2011; Sodring et al., 2020), France, Germany, Netherlands and Belgium (Vanhonacker & Verbeke, 2011), Italy (Di Pasquale et al., 2019), Brazil (Hötzel et al., 2020), Eastern Europe (Tomasevic et al., 2020a; Tomasevic et al., 2020b), and also a more recent study performed in 16 European countries, including Portugal (Aluwe et al., 2020).

This research aims to investigate Portuguese consumers awareness, beliefs, preferences and experience in issues like boar taint, castration and pork meat quality, observing possible demographic differences. It is also intended to identify clusters of consumers with similar attitudes, crossing them with demographic data in order to verify the existence of behavioural and consumption patterns in Portugal, following the methodologies of previous studies by Vanhonacker & Verbeke (2011) and Tomasevic (2020a).

MATERIALS AND METHODS

Research sampling and questionnaire

A consumer's survey was carried out online in 2020, between March 10th and April 10th, using the CAWI (Computer-Assisted Web Interviewing) data collection method. Data was collected using a web questionnaire, produced by Cognito Forms (<https://www.cognitofrms.com>, Cognito LLC©). The questionnaire was reviewed using a limited group of respondents in order to identify errors and also to verify if all questions were understandable and well interpreted by the respondents. The recruitment of the consumers was done randomly, publicizing a link via social networks and also further dissemination through institutional email addresses. A total of 158 respondents completed the survey, which took approximately 10 minutes and was only available in Portuguese. The questionnaire could only be submitted and saved into the database when all questions were filled by the respondents.

Prior information regarding piglet castration or boar taint was not provided to respondents, and the only information available at the first page of the questionnaire was related to its scope: 'The present questionnaire is intended to gather information on the opinion and perception of Portuguese consumers in relation to pork, about surgical castration, immunocastration and boar taint (entire male pig scent).' Participants' general demographic information and educational level about and frequency of consumption of pork was collected (Table 1). Also, 6 questions related to consumers' knowledge about castration and boar taint were made (Table 2).

Questions regarding consumer awareness, beliefs and preferences about castration and pig meat were based on previous studies conducted by Tomasevic et al. (2020a) and Vanhonacker & Verbeke (2011), which consisted in questions with multi-choice answers and sentences where respondents had to rank their opinion using the available scales (Tables 3 and 4). These scales varied from ‘Very easy’ to ‘Very difficult’ (5-point scale), ‘Bad’, ‘Neither good nor bad’, ‘Good’ (5-point scale) and ‘Totally disagree’ to ‘Totally agree’ (7-point scale).

Statistical analysis

Data were analysed using Statistica 7.0 software (Stat Soft Inc., USA). Hierarchical clustering with Ward’s method and squared Euclidean distance was measured using attribute importance scores on beliefs and preferences about castration and meat quality as segmentation variables (in a total of 21 variables), followed by a K-Means cluster analysis. The number of initial clusters was set based in the hierarchical procedure.

Descriptive statistics of the data was determined, and the differences between clusters were studied by one-way analysis of variance (ANOVA) and separated by Tukey’s honest significant differences test ($p < 0.05$).

RESULTS AND DISCUSSION

Demographic profile and consumption of pork

The demographic profile of the 158 Portuguese residents that completed the questionnaire (Table 1) showed that the majority of respondents were female (60.1%), 50% were less than 40 years old, 55.7% grew up in a rural area, and almost two-thirds lived in the North of Portugal. The most prevalent household members number were 3 to 4, and 77.2% had a university diploma. Regarding meat consumption, 46.8% stated eating pork more than once a week, while 13.9% rarely or never eats this meat.

Consumer experience and awareness

As stated in materials and methods, the population sample was randomly chosen, depending on the consumers’ willingness to fulfil the questionnaire, their access to the internet and the dissemination of the link that started the questionnaire. Since the topics

Table 1. Demographic profile and percentage of pork meat consumption of the respondents

	Overall (<i>n</i> = 158)
Gender	
Male	39.9
Female	60.1
Age	
21–39	50.0
40–55	34.2
> 55	15.8
Place of growing up	
Rural	55.7
Urban	44.3
Household members	
1–2	35.4
3–4	58.2
5 or more	6.3
Residence area	
North	64.6
Centre	16.5
South/Islands	19.0
Education level	
Elementary/Higher	22.8
University	77.2
Frequency of pork consumption	
More than once a week	46.8
Once a week	29.1
Fortnightly	10.1
Rarely/Never	13.9

covered are not normally in the general public domain, except for veterinary professionals, farmers, researchers or people with knowledge acquired by being born in a rural area, consumers were expected to exhibit limited knowledge of or no knowledge about boar taint and castration issues.

In order to assess the respondents' previous experience and knowledge related to boar taint and castration of male pigs, six questions were formulated (Table 2). Results showed that nearly half (46.2%) of the respondents did not know what boar taint was or even never heard about it, and 63.9% never had contact with tainted meat. When questioned about castration, consumers have revealed more knowledge about surgical castration than chemical castration (57.6% and 35.4% respectively), maybe because of the traditional practice of neutering piglets.

Table 2. Consumers' boar taint experience and awareness of castration methods

Question	%
Boar taint in pig's meat	
Never heard of	32.9
I heard about this, but I do not know what it is	13.3
I know what this is	53.8
Have you ever had contact with boar tainted pig's meat?	
I do not know	41.1
No (but I can identify the smell)	22.8
Yes	36.1
Surgical castration of pigs	
Never heard of	22.8
I heard about this, but I do not know what it is	19.6
I know what this is	57.6
Chemical castration of pigs	
Never heard of	33.5
I heard about this, but I do not know what it is	31.0
I know what this is	35.4
Surgical castration is an effective method to eliminate unpleasant smell in pig's meat	
I disagree	7.0
I do not know	53.8
I agree	39.2
Chemical castration is an effective method to eliminate unpleasant smell in pig's meat	
I disagree	7.0
I do not know	74.7
I agree	18.4

In concern to the effectiveness of the methods to eliminate boar taint, it appears that the lack of knowledge of both methods prevails in the responses of consumers. This answer is being more frequent in the chemical castration, where 74.7% stated their unknowledge. Also, 7% of respondents do not agree that both methods can eliminate boar taint, which can be just a primary emotive reaction against 'castration', or on the other hand it may also be due to a deep knowledge of the topic, since castrates and females can have high skatoles levels due to bad rearing conditions (Hansen et al., 1994).

In a similar study in four European countries, 88.7% of consumers expressed that they had never heard about boar taint or did not know what it was, and only 2% stated to know about immunocastration (Vanhonacker & Verbeke, 2011). Data retrieved from

a European exploratory survey showed that 71% of Portuguese consumers are aware of piglet castration, 33% have experienced a bad smell or taste in pig's meat and also only 3% of the respondents have negative feelings towards vaccination (Aluwe et al., 2020).

Segmentation analysis

Segmentation studies frequently utilize a single behavioural criterion to differentiate buyers by employing cross-sectional data (Assael & Roscoe, 1976). When consumer studies are performed it is relevant to detect segments of consumers to have a clear idea of their beliefs and attitudes: market segmentation is one area of behavioural research in which an understanding of attitudinal structure is applied directly to the development of marketing strategy. The combination of consumers' beliefs about product attributes with its demographic characteristics can result in a segmentation into defined groups (Bearden & Durand, 1977).

In order to divide the consumers into groups by its beliefs and attitudes and to characterize those groups by demographics, clustering procedure was followed as described in the methods section. Three clusters were set as the most adequate. Clusters were identified as A, B and C, containing 67, 41 and 50 consumers respectively. Variable scores for each cluster can be found in Tables 3 and 4.

Table 3. Consumers' attitudes and beliefs overall and cluster scores¹

Question	Overall (<i>n</i> = 158)	Cluster		
		A (<i>n</i> = 67)	B (<i>n</i> = 41)	C (<i>n</i> = 50)
In my opinion, the process of surgical castration of pigs is...*	2.97	2.91 ^a	2.51 ^a	3.44 ^b
In my opinion, the process of chemical castration of pigs is...*	2.75	2.87 ^a	2.34 ^b	2.94 ^a
I think chemical castration of pigs is something...**	2.45	2.70 ^a	3.00 ^a	1.66 ^b
Surgical castration causes pain to the animal***	4.97	4.45 ^a	4.29 ^a	6.24 ^b
Castration is unnecessary***	4.08	4.07 ^a	2.46 ^b	5.42 ^c
Castration is a wild act***	4.08	3.51 ^a	2.66 ^b	6.02 ^c
I would prefer alternatives to be found instead of male pigs' castration***	5.13	4.34 ^a	4.63 ^a	6.60 ^b

¹Cluster items in the same row with different superscripts are significantly different ($p < 0.05$); *1: Very easy; 2: Easy; 3: Neither easy or difficult; 4: Difficult; 5: Very difficult; **1: Bad; 2: Bad but necessary; 3: Neither good nor bad; 4: Good but unnecessary; 5: Good; ***1: Totally disagree; 4: Neither ... nor ... 7: Totally agree.

Attitudes and beliefs about castration

The general opinion of Portuguese consumers about the ease or difficulty of chemical or surgical castration had a score equivalent to 'neither good nor bad'. As they were required to answer all questions in order to complete the survey, consumers who probably had no knowledge about the topic probably chose to answer in a way that did not compromise the objective of the question. The opinion of the consumers about the difficulty to perform surgical castration might be related to the knowledge they have about it or by the information they have received about it during their life (Tomasevic et al., 2020a).

Respondents' overall scores classified the chemical castration as something bad but necessary, slightly agreed that surgical castration can cause pain to the animal and they had the 'neither agree nor disagree' classification regarding the necessity of castration

and the cruelty of such act. However, consumers slightly agreed that alternatives to castration should be found.

In line with these results, in a study assessing attitudes and beliefs of European consumers towards piglet castration and meat from castrated pigs, respondents agreed that surgical castration produces pain to the animal (score of 4.9), also did not have a clear opinion about the necessity of castration (score of 3.7) and were not sure if surgical castration is savage, with a score of 4.0 (Tomasevic et al., 2020a). Contrary to these results, Fredriksen et al. (2011) found that Norwegians considered castration a necessary procedure.

Beliefs and preferences about meat quality and buying behaviours overall and cluster scores are shown in Table 4. The opinion about most of the statements is neutral, that is, the average score corresponds to the category of ‘neither agree nor disagree’. These results could be interpreted as divided opinions or lack of knowledge about this subject. However, consumers slightly disagree that meat from castrated pigs is leaner, which could be sign of some degree of knowledge about the differences in meat quality.

Table 4. Beliefs and preferences about meat quality and buying behaviours overall and cluster scores^{1,2}

Question	Overall (<i>n</i> = 158)	Cluster		
		A (<i>n</i> = 67)	B (<i>n</i> = 41)	C (<i>n</i> = 50)
Traditional smoked products have the same quality if made with entire male's meat	3.68	3.70	3.37	3.90
Charcuterie products have the same quality if made with entire male's meat	3.71	3.78	3.39	3.88
Young male pig's meat (5 months) tastes better than from an adult (8 months)	3.82	4.25 ^a	4.00 ^a	3.08 ^b
Entire male's pig meat is healthier	3.82	3.48 ^a	3.68 ^{ab}	4.38 ^b
I do not like the idea of buying young pig's meat (5 months)	4.15	3.63 ^a	3.34 ^a	5.50 ^b
Chemical castration alters the quality of the meat	4.16	3.73 ^a	4.12 ^{ab}	4.76 ^b
Meat from castrated pigs has better quality	3.96	3.42 ^a	5.73 ^b	3.22 ^a
Meat from castrated pigs is leaner	3.06	3.43 ^a	3.51 ^a	2.20 ^b
I prefer to eat meat from castrated pigs	4.08	3.13 ^a	6.37 ^b	3.48 ^a
The meat from castrated pigs is more expensive	3.54	3.61	3.54	3.44
I am willing to pay more for meat from castrated pigs	3.33	3.36 ^a	4.88 ^b	2.02 ^c
Would you buy entire male's meat?	4.21	3.84 ^a	4.07 ^{ab}	4.82 ^b
I would buy charcuterie products made from entire male's meat	3.99	4.06	3.54	4.28
Pork purchased from butchers in Portugal has a pleasant smell / taste	4.28	4.25	4.70	3.98

¹ Cluster items in the same row with different superscripts are significantly different ($p < 0.05$);

² Scores 1: Totally disagree; 4: Neither ... nor ... 7: Totally agree.

Regarding buying behaviours, consumers also slightly disagreed that meat from castrates is more expensive and they are not willing to pay more for meat from castrated pigs. The results of the research of Aluwe et al. (2020) showed that Portuguese consumers consider that the most important attributes at purchase are good taste of meat (85%) and animal welfare (52%). However, Sodring et al. (2020) found that animal

welfare is clearly important to consumers but at the point of purchase, and often becomes secondary to other criteria.

When cluster scores about consumer attitudes and beliefs are analysed (Table 3), it can be noticed some behaviour patterns among them: cluster C individuals totally agree on the search for alternatives to castration and that surgical castration causes pain to the animal, also agree that castration is a wild act and unnecessary and they consider that chemical castration is something bad and surgical castration process is difficult.

In Table 4 the cluster analysis showed some differences and trends between groups of individuals, particularly in cluster C. This group disagrees that young male meat tastes better than meat from adult males, they do not like the idea of buying young pig's meat and also agree with that chemical castration changes que quality of meat. Moreover, cluster C individuals disagree that meat from castrated pigs is leaner and are willing to buy entire male's meat. Cluster B opinions are very different: they agree that castrated pork has better quality and they also prefer to eat meat from castrated pigs. Cluster A has mixed opinions comparatively to clusters B and C.

Clusters' attitudes, beliefs and preferences scores divide individuals into groups that could be categorized into ethical and chemicals-free orientations or more conservative, being flavour-oriented and choosing meat quality over animal welfare. Following this, cluster C consumers are mainly against castration and have welfare concerns, preferring a natural approach. Cluster B consumers are characterized for being more conservative, with a marked preference for castrated pigs' meat and assuming the necessity of castration, denying that it is a wild act. In cluster A, consumer's opinions tend to be moderate: they are sensitive to animal welfare but also aware of changes in the meat quality.

Table 5 shows the demographic characteristics of the clusters. Clusters B and C, which reveal the greatest differences of opinion between them, have some peculiarities in their demographic characteristics, which may explain some of their beliefs and preferences. Cluster B, the one with more conservative opinions, is mainly constituted by females (70.7%), are

Table 5. Clusters' demographics

	Cluster		
	A (n = 67)	B (n = 41)	C (n = 50)
Gender			
Male	43.3	29.3	44.0
Female	56.7	70.7	56.0
Age			
21–39	61.2	51.2	34.0
40–55	26.9	39.0	40.0
> 55	11.9	9.8	26.0
Place of growing up			
Rural	49.3	68.3	54.0
Urban	50.7	31.7	46.0
Household members			
1–2	34.3	41.5	32.0
3–4	56.7	56.1	62.0
5 or more	9.0	2.4	6.0
Residence area			
North	74.6	65.9	50.0
Centre	9.0	17.1	26.0
South/Islands	16.4	17.1	24.0
Education level			
Elementary/Higher	16.4	9.8	42.0
University	83.6	90.2	58.0
Frequency of pork consumption			
More than once a week	38.8	48.8	56.0
Once a week	31.3	31.7	24.0
Fortnightly	14.9	12.2	2.0
Rarely/Never	14.9	7.3	18.0

highly educated individuals (90.8%) and 68.3% grew up in a rural area. In cluster C, more welfare-oriented, 66% of the consumers have more than 40 years old and this is the group with the lowest percentage of individuals with a university degree.

CONCLUSIONS

This study revealed that Portuguese consumers have different awareness's, beliefs and preferences towards piglet castration methods and also about meat quality. Overall scores showed only a few defined opinions about the addressed issues, due mainly to the lack of information and knowledge of respondents. Castration of male piglets and boar taint are subjects that are normally not on the daily agenda of generalist information, and since it is a matter with some specificity, it can be assumed that a large part of the population does not have knowledge about the topics covered. However, cluster classification showed marked differences among groups of consumers, especially regarding meat quality and welfare issues, allowing classifying the behaviour and preferences of groups as moderate, conservative or oriented towards animal welfare and preferring a natural approach.

As a suggestion for future work, the network of contacts and dissemination of the questionnaire should be extended, as well as the duration of the study to increase the robustness of research findings.

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