

Mexican consumers' perceptions and attitudes towards farm animal welfare and willingness to pay for welfare friendly meat products

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Abstract

Increasing concerns about farm animal welfare have led to an increase in the availability of welfare-friendly-products(WFP), but little is known about how much more consumers are willing-to-pay(WTP)for WFP or about their buying trends in Latin America. In this study, a survey was given to 843 meat consumers in the city of Toluca, Mexico. The results show that consumers were interested in farm animal welfare issues and their ethical, sociological and economic implications, as in Europe. The people surveyed also conveyed a high level of empathy with animal feelings and emotions; however they clearly demanded more information and regulations related

To farm animal welfare. The majority of respondents expressed that they were WTP more for properly certified WFP, but mostly based on the benefits in terms of product quality and human health. If the demand for WFP begins to increase in Mexico, the supply chain should consider a certification system to guarantee product origin based on current conditions.

1. Introduction

Livestock production under intensive conditions has received considerable criticism from various segments of society (María, 2006), especially in Europe, Australia and North America, with the concomitant rise of the animal rights movement (Garcés, Cussen & Wirth, 2008). Although ethical arguments against the use of animal products have little effect on demand, they have been effective in increasing public concern about animal welfare issues (Zimbelman, Wilson, Bennett & Curtis, 1995). The public can influence the marketing and sale of welfare - friendly -products via their roles as citizens (influencing government policy by expressing existing public concerns) and consumers (choosing to purchase certain products instead of others) (De Graaf et al., 2016). Consumer concerns about animal welfare can also influence the ethical positioning of food companies, regarding, for example, indoor confinement, stocking densities (De Barcellos, Grunert & Scholderer, 2011), handling, long distance transport, livestock truck accidents, slaughter (Miranda-de la Lama, Sepulveda, Villarroel & Maria, 2011) and religious slaughter -Halal or Kosher - (Fuseini, Wotton, Hadley & Knowles, 2017). If consumers perceive poor practice in those areas, their attitudes towards industrial food products maybe negative and lead to decreased acceptance (De Barcellos et al., 2010). Changes in consumption habits may be a sign of a modification in the attitudes or perception towards a product (Gómez-Corona, Escalona- Buendía, García, Chollet & Valentin, 2016). The concerns and perceptions about animal welfare in the EU have also begun to influence production systems in other countries, especially if they export meat to EU markets (Miranda-de la Lama, Villarroel & María,2014).

In recent years, survey-based research on consumer perceptions and attitudes to farm animal welfare has increased, but mostly limited to Europe (Frewer, Kole, Kroon & Lauwere, 2005; María, 2006 ; Boogaard, Oosting ,& Bock, 2006 ; Vanhonacker , Verbeke , Van Poucke ,& Tuytens , 2007 ; Vanhonacker , Verbeke , Van Poucke , Buijs ,& Tuytens , 2009 ; Vanhonacker , Van Poucke , Tuytens & Verbeke , 2010 ; Leenstra

et al., 2011 ; Vecchio & Annunziata , 2012 ; Gracia , 2013 ; Musto , Faraone ,& Cellini, 2014;Kupsala, Vinnari, Jokinen,& Räsänen, 2015), United States (Kendall , Lobao ,& Sharp , 2006 ; Tonsor , Olynk ,& Wolf , 2009 ; Prickett , Norwood ,& Lusk , 2010 ; McKendree , Croney ,& Widmar , 2014 ; Wolf , Tonsor , McKendree , Thomson ,& Swanson , 2016), and Canada (Bejaei, Wiseman ,& Cheng , 2011 ; Spooner , Schuppli ,& Fraser, 2014). Animal welfare is an emerging topic in Latin America because of its impact on animal health, international trade, agri-food industry, marketing, and consumer perceptions (Schnettler, Vidal, Silva, Vallejos, & Sepúlveda, 2009). Latin America as a whole produce 35% of the world's food and includes two countries in the top 15 based on gross domestic product (Brazilis 6th, and Mexicois14th; World Bank,2012). With a population of 112 million, Mexico is the most populous Spanish -speaking country in the world, the second -most populous country in Latin America (after Portuguese-speaking Brazil), and the second-most populous country in North America, after the United States (Wikipedia, 2016).

Meat products have long been a staple of the Mexican diet, however the consumption of meat has increased considerably over the last few years as a consequence of diet diversification, resulting from rising incomes and new styles of food consumption (AAFC, 2013; Tellez - Delgado & Mora-Flores, 2015; Delgado - Suárez et al., 2016). Mexico occupied the fifth place in the world in terms of food sales per capita, behind Australia, USA, Spain and Brazil (Popkin, 2014). Per capita consumption of animal products in Mexico is 30 kg of poultry meat, 17 kg of beef, 16 Kg of pork meat and 1.5 kg by sheep /goat meat (USDA, 2014). Consumer demand determines both the healthiness of a diet through nutritional intake and the sustainability of products and production systems. Therefore, consumer food choices are crucial in shifting diets towards more healthy and sustainable consumption pat- terns (Verain, Sijtsema, & Antonides, 2016). Even with the current economic down turn, Mexican consumers, particularly from the upper middle and higher -income strata 's, still purchase high -quality meat (Huerta - Leidenz, Ruíz-Flores, Maldonado-Siman, Valdéz & Belk, 2014; Huerta - Leidenz, Howard, Flores, Ngapo ,& Belk , 2016). In this context, farm animal welfare in Mexico is attracting increasing levels of attention from organizations, consumers, policymakers, and civil society for several reasons, ranging from concerns with trade and sustainable production schemes, to the implementation of shared value strategies (Miranda-de la Lama et al., 2012). However, the literature related to consumer perceptions and attitudes about farm animal welfare in Mexico is limited (Santurtún, Tapia, González –Rebeles & Galindo, 2012). The aim of this study was to assess the perceptions and attitudes of Mexican consumers towards farm animal welfare and to discern whether they are willing-to-pay more for products to improve animal welfare.

2. Material and methods

The study was carried out in the Toluca Metropolitan Valley -TMV-(twenty -two municipalities), which is a densely populated (N 905 in- habitants/km²) area in the State of Mexico with a surface area of 2669.8km² (COESPO, 2015) and a population of 2,415,277, making it the fifth most populous metropolitan area in the country (INEGI, 2011). Toluca was selected because it is a city widely used by food market researches (Díaz-Víquez, Pérez-Hernández & Hernández-Ávila, 2015), food marketers and consulting companies since the sociodemographic profile of this town is representative of the Mexican Census of Population. In the last three decades, the population has grown as more people have arrived from other parts of the country due to government policies to decentralize industry. Additionally, the flow of goods and logistic services has increased in the area after the recent expansion of a highway, a new high-speed train and additions to the Toluca International Airport.

2.1. Study description

Personal interviews were conducted at eight supermarket chains that sold food from May to June 2015 with 843 people who were the main ones responsible for purchasing animal products at their home. The consumer interviews were conducted individually at the meat section of the supermarket (buying context) and took b 10 min to complete. All interviewees were informed about the purpose of the study and the confidentiality of the information provided. In recent years supermarkets have displaced local food shops, representing 60 % of the sales in products of animal origin in 2013 – 14 (Gasca & Torres, 2014). Respondents were selected using a quota sampling method with age, gender, education and origin (rural or urban), as quota control variables. The characteristics of the sample with respect to the quota control variables are presented in Table 1. The sampling frame was over 18years of age, living in TVM, and with Spanish as their first language. The Mexican population is relatively homogenous as 91% of the people use Spanish as their first language (INEGI, 2011). Ethnicity was not measured in our questionnaire. Women were slightly over-sampled (55.9%) compared with the gender proportions from the national 2010 census (51.2% women; INEGI, 2011). This is however judged to be reasonable in food-related consumer research since women normally out-represent men as those responsible for food purchases within the household (Verbeke & Viaene, 1999).

2.2. Questionnaire and measurement scales

A questionnaire was drawn up following a Likert -type scale animal welfare attitude assessment model (Mazas, Fernández -Manzanal, Zarza, & María, 2013). As ample of 84 consumers was used to validate the scale, which showed good internal reliability, with a Cronbach's alpha value of 0.66. The selected topics were based on a literature re- view and covered the whole supply chain, ranging from 'meat quality and welfare' up to 'consumer acceptance', and including issues related to legislation, traceability, and labelling, among others. Additionally, the questionnaire included some questions which were similar to those administered to consumers by the European Food Safety Authority in the Survey Attitudes of EU citizens towards Animal Welfare (EFSA,2007). The average survey completion time was 15 min and it had six sections.

The first section regarded attitudes towards the importance of farmed animal welfare (using a 10-point scale; 0 –not important- to 10 – very important). In that section, respondents were also asked about their perceptions regarding (1) whether children should be educated about animal welfare in schools, and (2) whether new animal welfare laws are needed to prevent abuse in the treatment of farm animals. This was done using the statement 'Do you think that ...' and measured based on an ordinal scale with five points, where, 1=surely not, 2=probably not, 3 it does not matter tome, 4 =probably yes, and 5 = definitely yes(S1). In the second section, the participants were questioned about their thoughts about their level of knowledge about farm animal welfare. The participants were presented with the statement 'What is your level of knowledge about the living conditions of farm animals?', on a five- point scale, with response categories '1 = None', '2 = Low', '3 = Medium', '4 = High', and '5 = Very High'. In the same section, the participants were asked about their perception about five aspects relative to animal welfare, based on a literature review about pain, emotions and fear (Mazas et al., 2013). The five sections asked, "Do you think that livestock" ...: i) should be well fed, sheltered and healthy? ii) should be able to express behaviours that are natural for their species, iii) should be free of fear and stress, iv) fell pain? v) are able to feel emotions? (positive or negative). As in the first section, we used a five point ordinal scale (S1).

The third section regarded the need for information about farm animal welfare, using the statement 'Do you think that ...'and measured on a five point ordinal scale (S1) as described above. The fourth section concerned general perception about current animal welfare conditions in Mexico. For example, participants were presented with the statement 'Do you think, in general, that the living conditions of farm animals has improved in Mexico in the last 10 years? and asked to indicate the level of improvement on a five-point

scale, with response categories '1 = Have gotten much worse', '2 = Have gotten somewhat worse', '3 = Not changed', '4 = Have improved somewhat', and '5 = Have improved very much'. In the fifth section, the respondents were asked about how animal welfare perceptions influence their buying behavior, and about their attitudes towards compensations for farmers and retailers. This was done using the statement S1. Respondents were asked about their willingness -to-pay more for WFPs, answering Yes or No. If yes, they were asked how much more, based on a percentage increase ranging from '1 = 1 –3%', '2 = 4 –5%', '3 = 6 –8%', '4 = 9 –10%', and '5 = N 10%'. The final section asked about some specific characteristics of buying behavior (main reasons to buy WFP, customer loyalty, labelling characteristics, and their concept of quality). Finally, measured on the same evaluation scale(S1), there were 12 items about the perceptions of consumers towards animal welfare in six sections of the questionnaire (Table2).

2.3. Statistical analysis

We used univariate, bivariate and multivariate statistics based on factor analysis. All statistical analyses were carried out using the software Package SPSS, Version 21.0. Descriptive statistics included percentages and means. In addition, several bi variant statistical tests were carried out. A Mann -Whitney U test and Kruskal Wallis analysis were used to analyse the relation between the assessment of the importance of animal welfare and the sociodemographic characteristics of the respondents. On the other hand, the relationship between willing-to-pay for WFP and the sociodemographic variables was established using the Chi-squared test. Finally, the relationship between factors and the sociodemographic variables were analyzed using an ANOVA and Student-t- test. The factor analysis was used to calculate correlations and summarize the 12 variables related to consumer perceptions towards animal welfare. The factorial analysis is a technique used to reduce and summarize information, allowing to explain the existing relationships between a specific number p of observable variables X_1, X_2, \dots, X_p . In the factorial analysis model, each observable variable X_i can be explained by m common factors ($m < p$) and a unique or specific factor of each variable. Thus, all the original variables are influenced by all the common factors as long as there is a unique factor for each variable. In that way, we can establish multidimensional correlations among the variables using the common factors. The factors were obtained using the principal component extraction model. The number of factors to be retained was identified using the criterion of eigenvalues > 1 . The Kaiser Meyer Olkin index (KMO) and Bartlett 's test of sphericity were used to measure correlations among variables to comply with the initial assumption of correlations. Once the components were extracted, in order to gain a better understanding of the factors, avarimax method of ortogonal rotation was carried out. Therefore, the factor scores in the analysis were estimated by regression. Finally, the relationship between new factors obtained and the socio -demographic variables were analysed using an ANOVA and Student-t-test.

3. Results and discussion

Overall, results show that Mexican consumers are interested in farm animal welfare issues and their ethical, sociological and economic implications, as in other parts of the world (e.g. the European Union -EU-), in agreement with Vanhonacker and Verbeke (2014), who reported that farm animal welfare in livestock production is a topical and important issue attracting growing interest of policy makers, consumers, and stakeholders in the supply chain and others. It is possible that increased exposure to international life styles and media, access to frequently up- dated information and telecommunication technologies have globalized socio-ethical concerns, including animal welfare (Dowling, 2015). The study results also reflect a high level of empathy with animal feelings and emotions, however consumers clearly demand more information and regulations related to farm animal welfare. Another important finding was the number of consumers that stated they followed a healthy diet with a wider concept of quality that includes ethical production conditions. In effect, the results indicate that the main reasons people chose to buy WFP were related to

quality and health issues, in agreement with Yiridoe, Bonti-Ankomah, and Martin (2005), and Martelli (2009).

3.1. Univariate and bivariate analysis

In the first section of the survey there was a significant effect of gender and education on attitudes towards the overall importance of farm animal welfare (10-point scale, from 0 –not important, to 10, very important). Even though the overall average value of the sample was high (8.1), women gave more importance to farm animal welfare than men (Fig. 1A; U of Mann-Whitney test, $P=0.003$), as did the more highly educated (Fig. 1B; Kruskal-Wallis test, $P=0.000$). In the global sample, the effect of age and origin was not significant (Mann-Whitney and Kruskal-Wallis, $P \geq 0.05$). The overall importance of the farm animal welfare was very similar, even higher, than that observed in the EU-25 consumers by EFSA (2007) with an average rating under eight (7.8). That score was slightly higher in the first European state members – EU-15-(8.1) than in the ten new Member States (7.5). The top score in EU was for Swedish respondents (9.0), and the lowest was for Latvia and Spain (6.9). The effect of gender, where women show a more positive attitude towards animal welfare, is in agreement with other studies (Herzog, 2007; Miranda -de la Lama, Sepúlveda, Villarroel & María, 2013; Vargas -Bello -Pérez, Riveros, Köbrich, Álvarez -Melo & Lensink, 2016; Cembalo et al., 2016). In general, women express more moral and ecological concerns about animal welfare and more sympathy for improved treatment of animals than men (Beardsworth et al., 2002; María, 2006). The higher concern by more educated consumers is similar to Boogaard et al. (2006), Vanhonacker et al. (2009), Santurtún et al. (2012), and Faver and Muñoz (2014). It may be linked to greater access to information about animal welfare issues through social media, and other communication tools (Dowling, 2015).

A high percentage of respondents considered that they have a medium level of knowledge about the living conditions of farm animals (46.3 %) while 8.4% and 26.9% stated they knew nothing or very little, respectively, and 5.9% and 12.5% thought they had a very high or high level of knowledge. We did not find any relationship between the level of knowledge and socio-demographic variables (Mann-Whitney and Kruskal-Wallis, $P \geq 0.05$). The results agree with EFSA report (2007), who found that 12% of European consumers claim to have a high or very high level of knowledge about farming conditions (18 % in our case). Around seven-tenths of EU consumers say to have some knowledge, as in our study. Compared to the EU, the declared level of knowledge of Mexican consumers was similar to the top five EU countries (Denmark, Sweden, Netherlands, Finland and Austria, respectively). It seems that declared knowledge in this area is related to the high proportion of respondents of rural origin. Another effect could be the increase of human-animal bonds as a consequence of the increase in pet ownership among families (Schoenfeld-Tacher, Kogan & Wright, 2010).

A statistical summary (average) of the 12 aspects included in the questionnaire relative to the perceptions of consumers towards animal welfare is presented in Table 2. Consumers clearly thought that farm animals are sentient beings (able to feel pain and emotions) and that they should be well fed, sheltered and maintained under healthy conditions. Our results demonstrate that Mexican consumers do consider aspects of animal welfare as they are related to the five freedoms, including those related to emotions and natural behavior. This suggests that they recognize farm animals as sentient beings, which could be used to develop tools to protect animals, applying knowledge about animal sentience to remedy and prevent animal suffering (Satz, 2010). The respondents expressed the need for new regulations regarding animal welfare in Mexico, and that the regulation should apply to imported animal products as well. In the same way, the respondents considered that farmers should be compensated for the costs of improving their production standards, suggesting a high level of empathy with producers. That result agrees with the Eurobarometer

survey of 2007 where 72% of Europeans also felt farmers should be compensated for higher production costs linked to improved animal welfare standards.

Respondent expressed willingness to change their retail store in order to acquire WFP. Store loyalty relates to familiarity with, attitude towards, and trust in the retailer, as well as ultimately, in the evaluation and acceptance of its animal products (Miranda –de la Lama et al., 2013). However, in Mexico, WFP are mainly commercialized by supermarket chains and the figure of the butcher has disappeared. The concept of loyalty is different when choosing between large supermarkets. This underlines the importance of correct product labelling. However, respondents were skeptical about the effectiveness of the current labelling system for products of animal origin. Those results agree with EFSA (2007), who report that most Europeans find that labelling does not help to identify WFP. Finally, the Mexican consumers surveyed mostly agree that animal welfare should be part of the teaching education programs in primary schools. Those results agree with María (2006), Toma, Stott, Revoredo -Giha, and Kupiec-Teahan (2012) and Mazas et al. (2013). In Mexico, a short, one -semester course could be given to 6- year -old children to provide them with the main concepts of animal welfare so that they maybe come more discerning consumers in the future (Aguirre & Orihuela, 2010).

Regarding the different stages of production systems, transport (20.6%) and lairage and slaughter procedures at the abattoir (18.4%) were mentioned as the two main critical points that put animal welfare at risk, followed by living conditions on the farm (15.4%), dehorning, teeth clipping and castration (15.2%). In 5th place were road accidents during transport (12.5%). Waiting periods at public cauction yards (9%) and milk egg harvest (8%), were seen as less risky. Those results may reflect the fact that live animals are transported in all production systems, a process which is usually highly visible to consumers (Miranda -de la Lama et al., 2014). When asked about effective ways to identify WFP, respondents mentioned logos and certifications (28.2%), as well as informative text on the package (23 .6%), campaigns (15 .7%) and colour codes (13 .2%). Posters, brochures (10.4%), and as core based on stars (7.9%) were less favoured. These results agree with EFSA (2007), who report that 74% of those surveyed preferred written text or logos are the best ways to identify WFP. Quality labels have a positive effect on the consumer and play an important informative role, but they should be clearly identifiable or related to certified quality brands (Sepúlveda, Maza & Mantecón, 2008).

In relation to who is best positioned to guarantee animal welfare standards at the farm level, respondents chose farmers (28%), veterinarians (16.8%) government officials (15.2%), consumers (13.5%), NGOs (11.7%), the food industry (7.5%), retailers (3.7%) and the NAFTA treaty (2.9%). Only 0.6% felt that nobody can guarantee animal welfare at farm level. In a survey in the EU, farmers and veterinarians were also seen as the best qualified (EFSA, 2007), followed by the government. Respondents seem quite confident that the professionals could preserve welfare involved in the care of animals (farmers and vets), in contrast with the poor concept of officials and institutions. Greater trust in institutions is likely to increase institutional quality and economic growth (Blanco, 2013), so, in this case, the lack of faith in institutions could jeopardize the growth of the WFP market.

Regarding why they buy WFP, the respondents mentioned better quality (23.7%), health bene fits to consumer (17.9%), obtained from healthy animals (16.3%), and a better quality/price ratio (12.5%). Other, less frequent reasons were better flavour (10.3%), beneficial for society (5.1%) and for the environment (3.7%). Only 8.2% of respondents mentioned increased animal welfare standards as the main reason for buying WFP and 2.1% said they never purchased them. In the EFSA (2007) survey, the top three reasons why consumers bought WFP were because they were healthier, of better quality and come from healthier animals. The 4th and 5th reasons were taste and animal welfare. The emphasis on the better quality of WFPs is probably the main reason their demand has increased in recent years, along with a general trend towards

healthy diets. The Mexican government is also actively promoting food education programs to help decrease obesity, which is the second highest in the world (Clark, Hawkes, Murphy, Hansen-Kuhn & Wallinga, 2012). Particularly in Europe, USA, Canada, America, Latin America and Australia, more and more “green consumers” consider environmental issues when making their daily purchases, demanding healthier, safer and better quality foods (Seegebarth, Behrens, Klarmann, Hennigs, & Scribner, 2016). A growing number of Mexican consumers are pursuing lifestyles that include healthier eating and buying organic foods (AAFC, 2013). Despite consumer concerns about animal welfare standards in livestock production systems, the market share of organic animal products is still low (De Jonge, Vander Lans, & Van Trijp, 2015). In Mexico, those types of products are in short supply and include other attributes

apart from animal welfare (i.e. organic certification products as: Flor de Alfalfa, Valle Orgánico, Terramaya, Biopollo, Pollo Real, SaBio, Aires del campo, Quinta Verde, La Rumorosa, Carnes Orgánicas de México, Green farmers-imported from Uruguay-, Kirkland signature,-imported from USA-). Several reasons are suggested for this citizen/consumer duality: limited (perceived) product availability; inadequate information provisioning; other product attributes (sensorial quality, food safety, and price) that outweigh animal welfare in the purchasing decision; and a lack of differentiation among products in terms of the level of animal welfare (De Graaf et al., 2016).

When our respondents were asked about additional characteristics, other than animal welfare, that could be considered important regarding product quality, they mentioned that WFP products are free of anti-biotics and hormones (24.8%) and free of diseases and pathogens (22.4%), promoting local markets (14.3%), organic or ecological benefits (12.4%), biodegradable packaging (12.2%), seasonal products (7.3%) and traditional products (5.5%). The results of our study agree with Martelli (2009), who found that the three main risk factors associated with conventional animal foods were residues of antibiotics, hormones and pathogens. Yiridoe et al. (2005) conclude that the preferred quality attributes of animal foods are safety, nutritive value, sustainability and healthiness for the family. It is not worthy that price was not one of the most important attributes in this latter study.

The results on WTP for WFPs are presented in Fig. 2. A total of 68.2% of respondents said they would pay more WFP. These findings are similar to a survey on Chilean consumers of meat (73%; Schnettler, Vidal, Silva, Vallejos & Sepulveda, 2008), and dairy products (68%; Vargas-Bello-Pérez et al., 2016). When asked to quantify the maximum price increase, only one in ten agreed to pay N 10% above the regular price. The remaining 90% were equally distributed into four price groups ranging from 1 to 10%. Our results are slightly lower than María (2006) for Spanish consumers (16% more) and Kehlbacher, Bennett, and Balcombe (2012) for the UK (26 to 32% more). According to a survey in the EU, most (57%) consumer's express willingness to pay more for WFP. A quarter expressed willingness to accept a 5% price increase, 21% agree to a 10% increase, and 11% to a 25% increase (Martelli, 2009). Overall, consumers in Western countries are willing to pay more for meat with higher welfare scores, tied with an efficient and guaranteed labelling system (Kehlbacher et al., 2012). Those authors conclude that, given the preferences for different levels of farm animal welfare, a labelling scheme in the form of a certified logo or a rating system appears generally feasible, in agreement with Toma et al. (2012).

According to our survey, respondents living in cities expressed more willingness to pay more for WFP, as opposed to rural consumers (Chi squared test $P = 0.009$). Welfare issues were reported to be more important for those living in urban areas, although rural respondents also had concerns. Knowledge of farm animal welfare was greater for those living in rural locations, and having some connection to agriculture. Living in a rural location was associated with less concern about animal welfare and greater acceptance of modern farming (Clark, Stewart, Panzone, Kyriazakis & Frewer, 2016). However, those results do not agree with

Weatherell, Tregear, and Allinson (2003), who found no significant differences between urban and rural respondents regarding willing.

3.2. Multivariate analysis

According to the factor analysis of consumer perception (Table 3), four factors explained 54.6% of the total variance. The KM value (0.806) and Bartlett test of sphericity ($P = 0.000$) suggest a high correlation among variables. The four factors were sensitivity, regulation, commerce and information about animal welfare. The first factor represents people with a high level of empathy towards farm animals, coincident with Furnham, McManus and Scott (2003). The second factor represents people concerned about the need for welfare regulations. Mexican legislation does not specifically address animal welfare issues and producers involved in the international meat export market rely on standards and information found in codes of good practice published by extension and research institutions, on private international certification agencies, and on the current available literature. This factor is coincident with the EFSA survey (2007) that found that the vast majority of Europeans believe there is a need for further improvements in farm animal welfare norms. This “pro-regulation group” was also concerned about teaching animal welfare in schools. The third group was concerned about economic compensation for farmers, the welfare standards for imported animal products, and identification of WFP. This partially agrees with the results of EFSA (2007) that reports that 66% of EU consumers believe that imported food should have to comply with the same regulations as in the EU. However, in that survey, only 34% of the respondents agreed with farmer compensation. The last factor relates to people that want more information about WFP, based on efficient and practical labelling systems. This type of consumer was identified by the EFSA survey (2007), representing about 58 % of EU respondents. A similar figure was found by Kehlbacher et al. (2012) and Toma et al. (2012).

We found a significant influence of age on the average value of the regulation factor (ANOVA, $P = 0.005$; Fig.3A). Older consumers were less aware of the need for new welfare regulations at the farm level and or education at schools. Those results agree with Clark et al. (2016), who found that older respondents had more negative attitudes regarding the acceptability of farm animal welfare practices or were more accepting of current standards. However, Patterson, Mugera, and Burton (2015) found that older people were more concerned about the living conditions of farm animals and consequently about the need for regulation (i.e. stock density, ventilation). Probably, the older Mexican consumers are less concerned about formal regulation and have greater confidence in the traditional human animal bond. That may also be related to less aware ness of animal welfare matters.

Consumer origin (Fig.3B) was significantly related with the regulation factor (t-Student, $P = 0.03$) and commerce factor (t-Student, $P = 0.000$). People with a rural background gave more importance to commerce while urban respondents underlined regulations. These findings could be because rural consumers have a better knowledge of the economic reality of farmers and the living condition of farm animals (Schröder & McEachern, 2004). Consequently, they are more aware about the risk of unfair competition from imported products with different animal welfare regulations, because many jobs depend on this sector. However, rural respondents were less concerned about the need for more regulations or formal education. There was no influence of consumer origin on vector sensitivity.

Finally, we found a significant relationship between willingness to pay more for WFP (Fig.4) and the average value of the sensitivity (t-Student $P = 0.000$), regulation (t-Student, $P = 0.007$) and commerce factors (t-Student $P = 0.000$). No significant differences were found between willing-to-pay and the information factor. That suggests that people who are willing -to-pay more for WFP, are more sensitive to animal welfare, demand proper regulations and are more concerned about the commerce issues (mainly an efficient labelling system). Previous research has demonstrated that some consumers are WTP more for a range of

products that exceed minimum welfare standards, indicating niche markets for WFP and that market -based solutions can play a role in maintaining welfare standards (Clarketal.,2016).

4. Conclusions and implications

We conclude that, according to our survey results, Mexican consumers appear to be interested in farm animal welfare and its ethical, sociological and economic implications. This tendency is more evident in women and the more educated. The respondents had a high level of empathy for animal needs and had a good working knowledge of the living conditions of farm animals. The consumers also demanded more information and more regulations about animal welfare. The majority of Mexican consumers said they were willing-to-pay more for properly certified WFP, but mostly based on the benefits in terms of product quality and human health (not animal welfare per se). In case the demand for WFP begins to increase in Mexico, the supply chain (farmers, abattoirs, food industries, and retailers) should consider a certification system to guarantee product origin based on the current situation in Mexico. At the same time, it will be necessary to inform consumers and convince the animal food industry that the ethical value of a product is an element of growing economic importance and a business opportunity. Our study contributes to the increasing strand of literature that highlights Mexican consumers' concerns about the farm animal welfare and their willingness-to pay for WFP.

Acknowledgements

This work was supported by PROMEP grants 103.5/13/8925 UAM- PTC-417 of G.C. Miranda-de la Lama. Miranda-de la lama and Rayas- Amor are members of the National Research System of the National Council on Science and Technology (SNI-CONACyT). Also, we thank the supermarket chains for allowing us to carry out the questionnaire.

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