Consumer preferences towards on-farm slaughtering – a discrete choice experiment

Antonia Johanna Bruns, Josephine Lauterbach, Anna Maria Häring

Faculty of Landscape Management and Nature Conservation, Eberswalde University for Sustainable Development, Schicklerstr. 5, 16225 Eberswalde, Germany
Antonia.Bruns@hnee.de
Josephine.Lauterbach@hnee.de
Anna.Haering@hnee.de

ABSTRACT

In Germany, animal welfare could play an increasingly important role both in the political discussion and in the purchasing decisions of consumers. This would create potential for a premium market segment for animal welfare related production standards. For beef, production standards, such as organic, focus on animal welfare (e.g. access to the outdoors). Animal transport and slaughter, present significant stress factors with negative impacts on animal welfare and meat quality. Communicating low stress slaughtering conditions may have significant sales potential for a premium market segment. In this paper, we investigate consumers' attitude towards and willingness to pay for beef that is slaughtered on-farm rather than in conventional abattoirs. An online survey (n=400), representative of the German population according to gender, age, income and education, was conducted in September 2022, which included a discrete choice experiment for the purchase of minced beef. We incorporated product attributes important for the purchase decision such as price, information on social and economic benefits of regional production and different production standards (conventional/ organic). Moreover, we included different information on the advantages of slaughtering on-farm. Our results show that the purchase decision is mainly influenced by price, whereby a low price provides the highest utility for consumers. Information on slaughtering was far more important for consumers in their purchase decision than the other two attributes (benefits of regional production and production standard). We conclude that providing on-farm slaughtering information can constitute an important benefit in marketing premium beef products. To use this potential, suitable communication approaches for different target groups should be derived.

Keywords: consumer preferences, marketing, discrete choice experiment, on-farm slaughtering

1. Introduction

In Germany, animal welfare and meat consumption has gained attention, both in the civil community and on the political agenda (Albersmeier and Spiller 2010; European Commission 2016; BMEL 2022; SPD et al. 2021). This development is also reflected in consumer choices when buying animal-based products such as meat (Carlsson et al. 2007b; Graaf et al. 2016; Zühlsdorf et al. 2016). In general, a trend towards overall sustainable consumption, especially linked to the regional/local origin of purchased goods can be observed (Schulze and Spiller 2008; BMEL 2022).

Although market shares of meat distinguished by high animal welfare standards are quite low in Germany (Statista 2019), studies point out that potential for value creation exists in premium markets (Schulze and Spiller 2008; Lagerkvist and Hess 2011; Janssen et al. 2016; Profeta and Hamm 2019; Stampa et al. 2020). One issue linked to animal welfare, which has not yet been investigated extensively is consumer preference and willingness to pay (WTP) to avoid animal transport and low stress slaughtering (Kühl et al. 2022; Hoeksma et al. 2017; Carlsson et al. 2007a).

As of 2021, revised EU regulations facilitate on-farm slaughtering, avoiding animal transport and stressfull slaughter at a conventional slaughterhouse. This enables farmers and marketing initatives to increase their production of meat from on-farm slaughtering and sell it to more consumers.

In this paper, we aim to gain more insight into consumer preferences for beef slaughtered on-farm by determining the willingness to pay (WTP) for on-farm slaughtering. We used a discrete choice experiment providing potential consumers with different hypothetical purchase situtations where they receive information on price, benefits of regional orgin and production standards and on slaughtering.

2. Transport and slaughter

At the end of their lives, most livestock will be transported to a slaughter facility for commercial meat production (Hultgren 2018; Statista 2022a). Transportation thereby describes the entire process from loading at the place of origin until unloading of animals at the destination. Typically, livestock is transported via trucks or trailers and then driven to the abattoir. Travel distances may be far and thus take several hours to accomplish, depending on the location of the slaughterhouse (Hultgren 2018).

Stresses caused by transport may range from fear to motion sickness/nausea due to vibration (Broom 2007; Santurtun and Phillips 2015). Temperature and humidity might lead to heat stress decreasing the animals' well-being. Another important factor influencing animal welfare during transport is loading density (La Miranda-de Lama et al. 2014). Grouping with unfamiliar conspecifics represents a social stressor, as cattle are social animals living in herds with an established hierarchy.

The process of slaughtering cattle in a conventional abattoir can be grouped into three main phases: pre stunning, stunning and bleeding, all taking place in a slaughtering facility (Nielsen et al. 2020). During the slaughtering process animals might experience fear or distress (Nielsen et al. 2020). If stunning is are not carried out correctly, cattle might experience pain and fear because they are not rendered unconscious and insensitive to pain (Velarde et al. 2016). If this is not detected and corrected immediately, animals might be conscious until before carcass dressing operations begin, resulting in extreme pain and suffering.

Currently, there are different options for the on-farm slaughtering of cattle in Germany, one being slaughter at an on-farm abattoir meeting legal standards and requirements concerning food hygiene and animal welfare. Typically, in these on-farm slaughterhouses only animals from the associated farm are slaughtered, eliminating the need for extensive transportation of animals (Land Brandenburg 2022). As of September 2021, the use of other on-farm practices are facilitated due to new EU regulations: Fully mobile slaughtering, partially mobile slaughtering and slaughter via gunshot which is only to be used for cattle that are free-ranging year-round (Land Brandenburg 2022).

Studies comparing stress levels in sheep slaughtered at a conventional abattoir to on-farm showed that animals slaughtered on-farm were less distressed than those at the conventional abattoir (Eriksen et al. 2013). Additionally, findings from Eriksen et al. (2013) suggest that meat from on-farm slaughtering may be of better quality due to reduced stress in animals before slaughter, which would justify selling this product at a higher price. These findings are also supported by results from a study by Hultgren (2018), who found that stress leads to deteriorated meat quality.

3. Consumer preferences when buying beef

There a numerous studies trying the determine the importance of the price when buying beef. Generally, unaided surveys and real-life experiments tend to show a high importance of price in the purchase decision (e.g. Enneking 2018; Klink and Langen 2015). For (cognitively) more conscious decisions, additional benefits such as regional origin and animal welfare are more important aspects and might also increase the willingness to pay for a meat product (Risius and Hamm 2017; Gremmer et al. 2016; Lauterbach et al. 2022).

The regional origin of a product can have a positive effect on consumer expectations regarding various quality criteria, such as an (expected) better taste, a fresher product, support for the local economy, environmentally friendly production, etc. In questionnaires, regional origin is usually asked about as a separate parameter in the purchase decision. In comparison to other attributes such as taste and freshness, regional origin tends to have little influence on the purchase decision (Heinze et al. 2014). In comparison to the organic label, a regional label appeals to broader sections of the population (Schulze-Ehlers and Purwins; Lauterbach et al. 2022).

Many aspects of the production and processing of meat are known only to a few consumers. This also includes the aspects of slaughter, processing and transport (Wille et al. 2017). Compared to other aspects of animal welfare, the issue of slaughter plays a subordinate role for consumers. Many consumers do not want to actively deal with the topic and are not looking for the relevant information (Klink and Langen 2015) as confrontation with the subject of slaughter can reduce the enjoyment of meat. Animal transport is viewed negatively by consumers, especially if they have some prior knowledge of the subject (Wille et al. 2017).

4. Material and Methods

An online survey (n=400), representative of the German population according to gender, age, income and

education (based on Statista 2022b). Participants were recruited via an online panel provider (Bilendi respondi) and received an incentive for participating. Only people who consume beef at least once a month were eligible for the survey. The questionnaire consisted of five sections: an introduction, a data protection agreement, screening questions concerning beef consumption, socio-economic and demographic questions, a discrete choice experiment and lastly, general questions regarding knowledge and willingness of participants to learn more about slaughter.

Discrete choice experiments aim to simulate real life market situations in which the consumers make a choice to either buy or not buy a product, depending on the perceived utility the given product offers to that individual consumer (Louviere et al. 2011; Backhaus et al. 2015; Hensher et al. 2005). The utility of a product is derived from the sum of all part worth utilities of the product attributes (Lancaster 1966). Mc Fadden's Random Utility Theory states that consumers seek to maximise their utility when buying a certain product (McFadden 1974).

Participants were confronted with 12 choice sets consisting of four options of minced beef to choose from. Minced beef was chosen as it is a product commonly known in Germany and therefore it was assumed consumers are comfortable with the product and potential ways of preparation. Two options were available in each choice set to provide participants with a realistic market situation: the base line option available at German supermarkets at the time (500g, €4.99, no information about slaughter, no information about benefits of regional origin, not organically produced) and a no-buy option. The other two alternatives offered in each choice set had varying attribute levels (see table 2). The baseline and the no-buy option were always presented in the same position (first and last option), while the alternating options were placed in between.

We analysed the choice experiment by running a cox regression in SPSS. Cox regression is based on a multinomial logit choice model which provides the relative importance of each utility attribute. The total utility (u) is a sum of all part worth utility scores (Backhaus et al. 2015)

$U = \beta_{\text{slaughtering}}\ \text{no live transport} + \beta_{\text{slaughtering}}\ \text{meat quality} + \beta_{\text{regional origin}}\ \text{fair payment} + \beta_{\text{regional origin}}\ \text{transparancy} + \beta_{\text{regional origin}}\ \text{regional feed} + \beta_{\text{price}}\ \text{price} + \varepsilon$

U: Total utility

ß: Part worth utility coefficient

ε: Error term

The results of the modeling were used to estimate the willingness to pay (WTP) for specific attribute levels. For this purpose the following formula was applied:

$$\text{WTP} = -\frac{\beta * attribute}{\omega}$$

ω: change in utility for €1

5. Results

Of the 400 respondents who completed the questionnaire 396 respondents were included in the analysis. The remaining participants were excluded, either as speeders, due to data quality issues or technical errors (Meade and Craig 2012, DeSimone et al. 2015). Table 1 shows an overview of demographic key figures.

Table 1
Key demographics from the online survey, missing % answered "no information"

Key demographics	Distribution in %
Gender	Male: 50.25 Female: 49.25 Diverse: 0.25
Age in years	18 - 34: 25 35 - 64: 51 65 and over: 24
Education	Without vocational qualifications: 3.51 Currently in school or vocational training: 10.78 Completed vocational education: 51.63 Academic degree: 33.08
Household net income in €	Under 1,500: 20 1,500 - 3,500: 46.25 Over 3,500: 31.2
Size of municipality	Under 5,000: 16.29 5,000 - 10,000: 18.05 10,000 - 100,000: 22.81 100,000 - 500,000: 15.79 Over 500,000: 21.8

We used Cox regression to estimate part-worth utilities for the different attribute levels (see table 2) with a chi-square value of 1918 and degrees of freedom=10 ($p<0.01$) The part worth utilites can be interpreted with regards to the base line which was set to 0.

Table 2
Results of the conjoint analysis using cox regression, base line scenario set to 0 (* p<0.01)

Attribute	Attribute levels	Part-worth utilities
Price (€/ 500g)	4.99 (base line) 6.99* 8.99* 10.99*	0 -.630 -1.411 -2.390
Information about slaughter	No information (base line) Slaughtered on the farm of origin (no live transport)* Slaughtered on the farm of origin (higher meat quality)*	0 .900 .781
Information about benefits of regional origin	No information (base line) Fair payment* Transparent supply chain* Regional feed	0 .284 .238 .090
Production standard	No information (base line) Organic*	0 .651
No buy option*	No buy option*	-2.327

Our results indicate that information about on-farm slaughter provided the highest part-worth utility, while the attribute level indicating no transport of living animals and hence higher animal welfare performed slightly better than the attribute level indicating higher meat quality. Information on the production standards also revealed a high part-worth utility for the potential consumers while information about benefits of regional origin only revealed fairly low utility scores of which some were not significant. As expected, the part worth utilities dropped when the prices increased.
Splitting the data according to the socio-demographics of the participants we could determine some differences in the part-worth utilities derived from information on slaughtering on-farm: Women drew a higher utility from information on on-farm slaughter than men, so did people who have completed a vocational training as compared to people with a university degree. Concerning the age of respondents, we see an increase in utility for on-farm slaughtering information with increasing age. This also applies to an increase

in income. Lastly, we calculated the willingness to pay for the different product attributes provided in the discrete choice experiment (Table 3). As already shown by the part-worth utilities, information on on-farm slaughtering translated into the highest WTP (€1.96 - €2.26), followed by the organic production standard (€1.63).

Table 3
WTP for different product attributes

Attribute	Attribute levels	WTP overall sample
Information about slaughter	Slaughtered on the farm of origin (no live transport) Slaughtered on the farm of origin (higher meat quality)	€2.26 €1.96
Information about benefits of regional origin	Fair payment Transparent supply chain Regional feed	€0.71 €0.60 €0.23
Production standard	Organic	€1.63

6. Discussion

Results indicate a preference of consumers for information on on-farm slaughtering over the other attributes presented. The specification “no live transport” provides consumers with the highest utility among the three levels of this attribute, followed by the specification “higher meat quality”. The WTP calculations show similar results.

Generally, concerns about animal welfare (no live transport) slightly exceed the preference for high quality. The choice for meat complying with very high animal welfare standards may be a result of ethical or altruistic motives, e.g., the concern for the well-being of a sentient creature. Altruistic arguments have already been shown to be strong motivators when influencing consumer attitude towards organic foods (Padilla Bravo et al. 2013). Another cause for the higher utility of the specification “no live transport” may be that higher animal welfare is often already associated with an increase in product quality (Thorslund et al. 2016).

There are several limitations to this study. The set up of the choice experiment had some technical shortcomings: all participants were presented with the exact same 12 choice sets which may have led to increasing respondent fatigue which impairs data (Backhaus et al. 2015). They may have enhanced sequence effects that favour prominent positions in the experiment design. In addition, the presented choice sets did not represent all possible choice set combinations, and as such results may have been influenced by unfavourable pairings of alternatives.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Funding

This research is part of the Master Thesis of Ms. Antonia Johanna Bruns. Funding was provided by the Federal Ministry of Education and Research in the programme "WIR! Change through Innovation in the Region" (funding numer: 03WIR0806A). Project duration: 02/2021 - 07/2023.

Publication bibliography

Albersmeier, Friederike; Spiller, Achim (2010): The Reputation of the German Meat Sector: A Structural Equation Model. In *German Journal of Agricultural Economics* (4). DOI: 10.22004/ag.econ.146102.

Backhaus, Klaus; Erichson, Bernd; Weiber, Rolf (2015): Fortgeschrittene Multivariate Analysemethoden. Berlin, Heidelberg: Springer Berlin Heidelberg.

BMEL (2022): Deutschland, wie es isst Der BMEL-Ernährungsreport 2022. Available online at https://www.bmel.de/SharedDocs/Downloads/DE/Broschueren/ernaehrungsreport-2022.pdf?__blob=publicationFile&v=8, checked on 1/19/2023.

Broom, D. M. (2007): Causes of poor welfare and welfare assessment during handling and transport. In : Livestock handling and transport. 3rd ed. UK: CABI, pp. 30–43. Available online at http://dx.doi.org/10.1079/9781845932190.0030.

Carlsson, F.; Frykblom, P.; Lagerkvist, C. J. (2007a): Consumer willingness to pay for farm animal welfare: mobile abattoirs versus transportation to slaughter. In *European Review of Agricultural Economics* 34 (3), pp. 321–344. DOI: 10.1093/erae/jbm025.

Carlsson, F.; Frykblom, P.; Lagerkvist, C. J. (2007b): Consumer willingness to pay for farm animal welfare: mobile abattoirs versus transportation to slaughter. In *European Review of Agricultural Economics* 34 (3), pp. 321–344. DOI: 10.1093/erae/jbm025.

DeSimone, Justin A.; Harms, P. D.; DeSimone, Alice J. (2015): Best practice recommendations for data screening. In *J. Organiz. Behav.* 36 (2), pp. 171–181. DOI: 10.1002/job.1962.

Enneking, Ulrich (2018): Kaufbereitschaft bei verpackten Schweinefleischprodukten im Lebensmitteleinzelhandel. Realexperiment und Kassenzonen-Befragung. Edited by Hochschule Osnabrück, checked on 5/6/2020.

Eriksen, Marit Skog; Rødbotten, Rune; Grøndahl, Ann Margaret; Friestad, Mari; Andersen, Inger Lise; Mejdell, Cecilie M. (2013): Mobile abattoir versus conventional slaughterhouse—Impact on stress parameters and meat quality characteristics in Norwegian lambs. In *Applied Animal Behaviour Science* 149 (1-4), pp. 21–29. DOI: 10.1016/j.applanim.2013.09.007.

European Commission (2016): Attitudes of Europeans towards animal welfare. Available online at https://data.europa.eu/doi/10.2875/884639, checked on 1/18/2023.

Graaf, Sophie de; Vanhonacker, Filiep; van Loo, Ellen; Bijttebier, Jo; Lauwers, Ludwig; Tuyttens, Frank; Verbeke, Wim (2016): Market Opportunities for Animal-Friendly Milk in Different Consumer Segments. In *Sustainability* 8 (12), p. 1302. DOI: 10.3390/su8121302.

Gremmer, Pia; Hempel, Corinna; Hamm, Ulrich; Busch, Claudia (2016): Zielkonflikt beim Lebensmitteleinkauf: Konventionell regional, ökologisch regional oder ökologisch aus entfernteren Regionen? Edited by BÖLN. Available online at https://www.orgprints.org/30487/, checked on 4/20/2020.

Heinze, Karen; Xouridas, Stergois; Gebhardt, Beate; Becker, Tilman (2014): Verbraucherpräferenzen gegenüber regionalen Produkten: Ein Vergelich von West- und Ostdeutschland. In *Berichte über Landwirtschaft,* checked on 4/20/2020.

Hensher, David A.; Rose, John M.; Rose, John M.; Greene, William H. (2005): Applied Choice Analysis. A Primer: Cambridge University Press.

Hoeksma, Djura L.; Gerritzen, Marien A.; Lokhorst, Anne Marike; Poortvliet, P. Marijn (2017): An extended theory of planned behavior to predict consumers' willingness to buy mobile slaughter unit meat. In *Meat science* 128, pp. 15–23. DOI: 10.1016/j.meatsci.2017.01.011.

Hultgren, J. (2018): Is livestock transport a necessary practice? Mobile slaughter and on-farm stunning and killing before transport to slaughter. In *CABI Reviews* 2018, pp. 1–15. DOI: 10.1079/PAVSNNR201813054.

Janssen, Meike; Busch, Claudia; Rödiger, Manika; Hamm, Ulrich (2016): Motives of consumers following a vegan diet and their attitudes towards animal agriculture. In *Appetite* 105, pp. 643–651. DOI: 10.1016/j.appet.2016.06.039.

Klink, Jeanette; Langen, Nina (2015): Are animal welfare aspects of relevance in consumers' purchase decision? 328 - 346 Pages / Proceedings in Food System Dynamics, Proceedings in System Dynamics and Innovation in Food Networks 2015 / Proceedings in Food System Dynamics, Proceedings in System Dynamics and Innovation in Food Networks 2015. DOI: 10.18461/pfsd.2015.1528.

Kühl, Sarah; Bayer, Elisa; Busch, Gesa (2022): Should organic animals be slaughtered differently from non-organic animals? A cluster analysis of German consumers. In *Org. Agr.* 12 (4), pp. 531–545. DOI: 10.1007/s13165-022-00407-0.

La Miranda-de Lama, G. C.; Villarroel, M.; María, G. A. (2014): Livestock transport from the perspective of the pre-slaughter logistic chain: a review. In *Meat science* 98 (1), pp. 9–20. DOI: 10.1016/j.meatsci.2014.04.005.

Lagerkvist, C. J.; Hess, S. (2011): A meta-analysis of consumer willingness to pay for farm animal welfare. In *European Review of Agricultural Economics* 38 (1), pp. 55–78. DOI: 10.1093/erae/jbq043.

Lancaster (1966): A New Approach to Consumer Theory. In *Journal of Political Economy*. DOI: 10.1086/259131.

Land Brandenburg (2022): LEITFADEN ZUR SCHLACHTUNG IM HERKUNFTSBETRIEB. Available online at https://msgiv.brandenburg.de/sixcms/media.php/9/Leitfaden_Schlachtung_Herkunftsbetrieb_20220720.pdf, checked on 1/19/2023.

Lauterbach, Josephine; Haack, Micheala; Häring, Anna Maria (2022): Co-production of Business Models for Pasture-Based Beef in North-East Germany – Integrating Consumers Preferences. 167 - 177 Pages / Proceedings in Food System Dynamics, PROCEEDINGS IN SYSTEM DYNAMICS AND INNOVATION IN FOOD NETWORKS 2022. DOI: 10.18461/pfsd.2022.2215.

Louviere, Jordan J.; Pihlens, David; Carson, Richard (2011): Design of Discrete Choice Experiments: A Discussion of Issues That Matter in Future Applied Research. In *Journal of Choice Modelling* 4 (1), pp. 1–8. DOI: 10.1016/S1755-5345(13)70016-2.

McFadden, Daniel (1974): The measurement of urban travel demand. In *Journal of Public Economics* 3 (4), pp. 303–328. DOI: 10.1016/0047-2727(74)90003-6.

Meade, Adam W.; Craig, S. Bartholomew (2012): Identifying careless responses in survey data. In *Psychological methods* 17 (3), pp. 437–455. DOI: 10.1037/a0028085.

Nielsen, Søren Saxmose; Alvarez, Julio; Bicout, Dominique Joseph; Calistri, Paolo; Depner, Klaus; Drewe, Julian Ashley et al. (2020): Welfare of cattle at slaughter. In *EFSA journal. European Food Safety Authority* 18 (11), e06275. DOI: 10.2903/j.efsa.2020.6275.

Padilla Bravo, Carlos; Cordts, Anette; Schulze, Birgit; Spiller, Achim (2013): Assessing determinants of organic food consumption using data from the German National Nutrition Survey II. In *Food Quality and Preference* 28 (1), pp. 60–70. DOI: 10.1016/j.foodqual.2012.08.010.

Profeta, Adriano; Hamm, Ulrich (2019): Do consumers care about local feedstuffs in local food? Results from a German consumer study. In *NJAS: Wageningen Journal of Life Sciences* 88 (1), pp. 21–30. DOI: 10.1016/j.njas.2018.12.003.

Risius, Antje; Hamm, Ulrich (2017): The effect of information on beef husbandry systems on consumers' preferences and willingness to pay. In *Meat science* 124, pp. 9–14. DOI: 10.1016/j.meatsci.2016.10.008.

Santurtun, Eduardo; Phillips, Clive J. C. (2015): The impact of vehicle motion during transport on animal welfare. In *Research in veterinary science* 100, pp. 303–308. DOI: 10.1016/j.rvsc.2015.03.018.

Schulze, B; Spiller, A (2008): WER GEHT NOCH AN DIE THEKE? ERGEBNISSE EINER VERBRAUCHERSTUDIE ZU SB-FLEISCH. In *Schriften der Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaues e.V,* checked on 4/15/2020.

Schulze-Ehlers, Birgit; Purwins, Nina: Mehrzahlungsbereitschaft für Tierwohl: Fiktion, Nischenphänomen oder Zukunftstrend? In : Agrar- und Ernährungswissenschaftlichen Fakultät, Christian der Agrar- und Ernährungswissenschaftlichen Fakultät der Christian-Albrechts-Universität zu Kiel (Hg.) 2016 – Die großen Weichenstellungen.

SPD; Bündnis 90/ Die Grünen; FDP (2021): MEHR FORTSCHRITT WAGEN. KOALITIONSVERTRAG ZWISCHEN SPD, BÜNDNIS 90/DIE GRÜNEN UND FDP. Available online at https://www.bundesregierung.de/resource/blob/974430/1990812/04221173eef9a6720059cc353d759a2b/2021-12-10-koav2021-data.pdf?download=1.

Stampa, Ekaterina; Schipmann-Schwarze, Christin; Hamm, Ulrich (2020): Consumer perceptions, preferences, and behavior regarding pasture-raised livestock products: A review. In *Food Quality and Preference* 82, p. 103872. DOI: 10.1016/j.foodqual.2020.103872.

Statista (2019): Geht Geiz über Tierschutz? Available online at https://de.statista.com/infografik/17110/marktanteile-ausgewaehlter-fleischprodukte, checked on 1/20/2023.

Statista (2022a): Fleischverarbeitung in Deutschland. Available online at https://de.statista.com/themen/4069/fleischverarbeitung-in-deutschland/#topicHeader__wrapper, checked on 1/19/2023.

Statista (2022b): Statistiken zur Einwohnerzahl in Deutschland. Available online at https://de.statista.com/themen/20/einwohnerzahl/#dossierKeyfigures, checked on 1/20/2023.

Thorslund, Cecilie A.H.; Sandøe, Peter; Aaslyng, Margit Dall; Lassen, Jesper (2016): A good taste in the meat, a good taste in the mouth – Animal welfare as an aspect of pork quality in three European countries. In *Livestock Science* 193, pp. 58–65. DOI: 10.1016/j.livsci.2016.09.007.

Velarde, Antonio; Raj, Mohan; Grandin, Temple (2016): Animal Welfare at Slaughter: 5m Books Ltd.

Wille, Stefan Clemens; Busch, Gesa; Spiller, Achim (2017): Tiertransporte in der Schweinehaltung: Führen mehr Informationen und Wissen bei Verbrauchern zu einer positiveren Einstellung? In *GJAE* (66), pp. 1–12, checked on 4/21/2020.

Zühlsdorf, Anke; Spiller, Achim; Gauly, Sarah; Kühl, Sarah (2016): Wie wichtig ist Verbrauchern das Thema Tierschutz? Edited by Zühlsdorf + Partner Marketingberatung. Göttingen, checked on 4/15/2020.