Improved Process Quality through Certification Systems: An Assessment of Selected Animal Welfare Labels

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Abstract

The process quality of food products is currently the subject of increased attention. In the area of meat production, public discussion has centered on perceived low standards of animal welfare. Besides an increase in legislative regulations, improved animal welfare standards are most frequently achieved through the establishment of so-called animal welfare labels. So far these labeling concepts have not been substantially evaluated in terms of how well they carry out their goal of improving process quality in agricultural animal husbandry. This paper will use a recognized list of criteria to evaluate selected animal welfare labels Results show that competing labels vary strongly regarding the improvement of process quality. This has far-reaching effects not only for consumers and other label users, but also for companies that want to enter the animal welfare segment of the meat market.

Keywords: Animal welfare label, certification systems, process quality of food products

1 Introduction

Today consumer's willingness to pay more for food products is no longer triggered by intrinsic quality attributes (taste, smell, appearance, safety, freshness, convenience, etc.) as much as by so-called extrinsic quality attributes which relate to the food's origin, production methods (e.g. organic), impact on trade relationships (fair trade) or environmental impact (e.g. carbon footprint or food miles). These extrinsic characteristics usually describe the organization of production, trading or logistic processes along food supply chains. Together these extrinsic attributes can be used to evaluate the process quality of food [1].

In developed countries, when consumers purchase food and other essential goods, they pay increasing attention to the ethical and sustainable aspects of products [2]. Concerning meat production, for instance, required animal welfare standards regarding breeding, husbandry, transportation and slaughter have dominated public discussion [3].

Food labels could serve as quality signals and help consumers who prefer certain product or process qualities to make purchasing decisions. Animal welfare labels can establish higher standards for animal welfare for this market segment, therefore creating consumer willingness to pay more [4]. However, adequate research does not exist that helps to determine the extent to which such a label would improve standards in agricultural animal husbandry. This paper aims to close this gap. For this purpose, a list of evaluation criteria is developed and applied to selected animal welfare labels. This provides a solid basis for evaluating and improving process qualities of food products of animal origin.

The following chapter outlines the current state of research concerning animal welfare labelling and introduces those labels which will be considered for the study. The third chapter describes the applied research methods. The fourth chapter shows the results. The derived list of criteria to three German labels concerning animal welfare is applied and the three labels are compared and evaluated as they apply to pork production. The paper closes with a discussion and reflections on needs for further research.

2 Animal Welfare Labelling

As noted briefly in the introduction, the topic of animal welfare has gained relevance not only in the media but also in society [5]. Recent knowledge in animal health science, biology, the science of animal husbandry, and animal welfare ethics recognize ever greater the intrinsic worth of animals. Therefore, a fundamental change in western societal values has taken place. Society scrutinizes agricultural husbandry and is increasingly turning away from an anthropocentric view of animal health [6]. Closely related to the growing interest in animal protection is the projected higher perceived value of meat derived from animals which were handled according to higher animal welfare standards7]. Various marketing surveys estimate that 20 to 30 % of consumers in Western Europe see current conditions of animal husbandry as being deficit and demand higher animal welfare standards. Furthermore, consumers are willing to pay about 10 to 35 % more for these products compared to standard products [3]. Despite the great sales potential for products from more animal welfare friendly husbandry, a corresponding selection of products geared to animal welfare can only be found in a few countries (e.g. Switzerland). Currently, the market segment for these products in Germany is marginal (mostly < 1 %) [3, 4]. A common argument for the limited market success is that consumers are confronted with an "information overload" which stems from the numerous label initiatives [4]. Additionally, the increased costs of improved animal standards lead to a considerable price gap between the improved product and the standard one [8].

As is known by sales of organic products, consumers' willingness to pay a higher price is decidedly dependent upon definite marketing measures. For meat produced from more animal friendly husbandry to obtain a successful point-of-sale placement, it must be correspondingly positioned in the marketplace [3, 9]. Meat from particularly species-appropriate production could have a suggested retail price somewhere between the standard and organic products because not all animal welfare measures require additional costs. From another perspective, not all requirements of organic production are relevant to animal welfare, so there would be a sizeable margin for savings [3]. A wide ranging animal welfare market segment with a noteworthy share of the market would bring advantages due to its large scale and a good utilization of by-products and could justify setting product prices just moderately above the standard product [10]. This would also be more appealing to customers who find the price of organic products prohibitively high [3].

In order to offer species-appropriate meat products in the marketplace, criteria must be developed to evaluate animal welfare. Scientific research has developed a comprehensive, integrative approach to evaluate farm animal welfare, which concentrates on four areas: housing systems, management practices, animal behavior and animal health. Housing systems and management practices are factors which the producers can change and which affect animal behavior and animal health. Animal behavior and animal health reflect the well-being of the animals [3].

For example, in pig production, the current key animal welfare problems lie in the area of housing systems, density of population (size of group, method of grouping), available space, sty design (barn design, ventilation techniques, liquid manure systems) and the use of inappropriate flooring. Deficits in the housing system have effects on animal behavior. Often pigs that are unable to follow their instinct to play and dig develop conspecific aggressive behavior, e.g. as exhibited by tail-biting. Their health can also be affected, e.g. by damage to hooves or swollen joints. In the management area, animal observation, population inspection, animal handling, measures for hygiene and disease prevention, and short transportation routes are important to uphold the welfare of pigs. Common procedures done on animals, such as the grinding of cupid teeth, shortening of tails or performing castration without an anesthetic, cause pain and are to be viewed with disfavor [3, 11].

Due to current public discussion, some labels relating to animal welfare have been developed in recent years in Germany. Labels relating to animal welfare serve as quality signals to inform consumers about the measure of an important process quality, i.e. the humane treatment of animals. However, a label itself is a trust good which can gain additional trust by undergoing external examination by an independent certification agency [12]. Labels which signal trust attributes for foodstuffs are, therefore, often granted on the basis of certification systems [3].

This study will evaluate and examine three of these labels: the labels of the Neuland Association and the German Animal Protection Society as well as the "Action Animal Welfare" (Aktion Tierwohl) of the Westfleisch slaughterhouse. The Neuland Association (Neuland) was founded in 1988 by various civil society organizations and aimed to establish a humane, quality-oriented, animal welfare and environmental-friendly animal husbandry which has high credibility and provides transparency within farm operations [13]. For a long time it remained the only distinct animal welfare label in Germany. The animal welfare label "Für mehr Tierschutz" (Tierschutzbund) was developed in 2009 by the German Animal Protection Society in cooperation with representatives from science, agriculture, processing and retail; in 2012 it was introduced into the pork and poultry meat markets. This label encompasses a basic and a premium stage; each sets its own requirements for animal husbandry, the transportation of animals and the slaughtering process [14]. In addition, the Westfleisch Company has introduced an animal welfare label in the context of its firm initiative "Aktion Tierwohl". Better housing conditions are intended to improve the general welfare of the animals [15].

The criteria of various animal welfare labels have often been the object of scientific inquiry [3, 4]. However, until now there has been no study comparing the above-mentioned labeling concepts in the German meat market. With this in mind, this study will use a relevant list of criteria to compare and then evaluate the selected certification systems related to animal welfare. Pork production will be used as the basis for these observations. This will provide information which will help develop existing approaches and thus improve process quality in meat management.

3 Materials and Methods

The development of the set of criteria was based on a comprehensive analysis of current literature on animal welfare in animal husbandry and animal welfare labels. In conducting this research, it became evident that the German Quality and Safety (QS) certification system provides an appropriate point to approach the selection of animal welfare criteria and evaluate the animal welfare labels. QS is a quality control system for the production, processing and marketing of food products which mainly aim at ensuring product safety in all essential steps of the food chain. Besides adhering to legal requirements, actual risks within food production are overseen. In especially important areas (e.g. animal welfare), KO criteria are defined. If these are disregarded, it will lead to a loss of the QS certificate. Because of the great marketing importance of the QS system, pork production in adherence to its guidelines can today be considered equal to the standard production in Germany [16].

First, in the process of developing an evaluation system based on QS guidelines for swine husbandry, all criteria related to animal welfare were chosen from the QS list of certification criteria. The QS requirements for these criteria were then compared to the respective requirements of the various animal welfare labels (Tables 1, 2 and 3). Criteria for which no difference between QS and the other labeling systems could be determined were not included in the set of assessment criteria. A total of 28 criteria for the assessment of animal welfare standards were chosen. The criteria were organized by the following production stages: "breeding and development of piglets" (in short: breeding), “growing and fattening“ (fattening) and "transportation and slaughtering" (slaughtering). Regarding results, the evaluation of animal welfare was carried out using characteristics of housing systems (housing) and management practices (management), because the data basis did not allow for a direct evaluation of animal health and behavior. All criteria were, therefore, assigned to one of these two categories. The housing category thus contained 12 criteria, whereas the management category had 16.

The animal welfare labels under analysis were evaluated using a scale with 3 levels (0 = no; 1 = some and 2 = a definite improvement in comparison to the QS standard). The labels were evaluated not only as a whole (28 criteria, maximal 56 points) but also according to the individual categories of housing (12 criteria, maximal 24 points) and management (16 criteria, maximal 32 points). For all three labels, the respective points were determined and additionally the percentage of maximum possible points was calculated in order to improve comparability.

To be able to compare the animal welfare labels in regard to the individual stages of production, the intermediate sum of the evaluation for housing and management criteria for the various stages was depicted. The respective number of points each label received is additionally reported as a percentage. The breeding stage with 10 criteria has a maximum of 20 points, the fattening stage with 12 criteria a maximum of 24 points, and the slaughtering stage with 6 criteria a maximum of 12 points.

3 Results

The results show that the individual labels differ partly seriously. To illustrate the differences between the labels, the various guidelines in the production stages of breeding, fattening and slaughter were shown by way of orientation to the chosen set of criteria. In addition, Tables 1 to 3 reveal the evaluation of individual labels. The ratings (0, 1 or 2) refer to the scale outlined above.

Table 1: Set of Criteria and Evaluation of the Production Stage for the Breeding and Development of Piglets

Criteria • Category	QS criteria	Neuland	Tierschutzbund Basic Grade	Tierschutzbund Premium Grade	Westfleisch Aktion Tierwohl
Breeding • management	no requirements	robust breeds, mother sow has MHS status NN **2**	if possible, only animals with MHS status NN **1**	if possible, only animals with MHS status NN **1**	no additional requirements **0**
Raw fiber • housing	until 1 week before delivery: min. 200 g/day	sufficient amount of straw for all animals **2**	no additional requirements **0**	no additional requirements **0**	Pregnant sows receive more raw fiber than **1**
Space for sow • housing	>40 sows: ≥ 2.05 m²/sow	2 m² stall and 1.5 m² pen pro sow **2**	no additional requirements **0**	no additional requirements **0**	40 sows ≥ 2.25 m²/Sau **1**
Materials for building nest • housing	straw or similar material, depending on waste refusal system	long-stemmed straw is available **2**	no additional requirements **0**	no additional requirements **0**	chipped wood, hay or straw **1**
Fixation of the sow • housing	max. 1 week before farrowing until 4 weeks postpartum	until 10 days after farrowing **2**	no additional requirements **0**	no additional requirements **0**	no additional requirements **0**
Suckling pig • housing	Protective equipment to prevent being crushed, piglet nest not perforated, able to be heated	farrowing alcove ≥ 5 m², after 14 days, with possibility to go out **2**	no additional requirements **0**	no additional requirements **0**	no additional requirements **0**
Suckling period • management	min. 3 weeks	approx. 6 weeks **2**	no additional requirements **0**	no additional requirements **0**	min. 4 weeks **1**
Castration • management	7th day of life w/o anesthetic, pain medication required	with anesthetic and pain analgesic **1**	allowed with anesthetic and pain analgesic ** **1**	allowed with anesthetic and pain analgesic ** **1**	renounce castration **2**
Tail docking • management	until the 3rd day of life, the tail can be shortened a max. of 1/3 w/o anesthetic	forbidden **2**	forbidden (since January 1, 2014) **2**	forbidden **2**	no additional requirements **0**
Grinding of canine teeth • management	until the 7th day of life, allowed w/o anesthetic; pinching off forbidden	forbidden (exception: when veterinarian orders it) **2**	no additional requirements **0**	no additional requirements **0**	no additional requirements **0**

Source: authors' illustration according to [17, 18, 19, 20, 21, 22, 23], own evaluation

Table 2: Set of Criteria and Evaluation for the Fattening Stage of Production

Criteria • Category	**QS criteria**	**Neuland**	**Tierschutzbund Basic Grade**	**Tierschutzbund Premium Grade**	**Westfleisch Aktion Tierwohl**
GMO feed • management	allowed	forbidden **2**	allowed until December 31, 2015 **0**	forbidden **2**	allowed **0**
Relationship of animal to feeding place • housing	rationed feeding: 1:1 dry feed : ad libitum, 4:1 pap feeding: no information	rationed feeding: no further guidelines dry feed: ad libitum, 3:1 pap feeding: ad libitum, 8:1 **1**	rationed feeding: no further guidelines dry feed: ad libitum, 3:1 pap feeding: ad libitum, 8:1 **1**	rationed feeding: no further guidelines dry feed: ad libitum, 3:1 pap feeding: ad libitum, 8:1 **1**	rationed feeding: no further guidelines no further guidelines no further guidelines **0**
Daily weight gain • management	no limit	max 700g per day **2**	no limit **0**	no limit **0**	no limit **0**
Relationship of animal to drinking trough • housing	ad libitum 12:1 animals per drinking trough	ad libitum 10:1 animals per drinking trough **1**	ad libitum 12:1 animals per drinking trough **0**	ad libitum 12:1 animals per drinking trough **0**	no further guidelines **0**
Water quality • management	no guidelines	no further guidelines **0**	no further guidelines **0**	no further guidelines **0**	drinking water quality **1**
Antibiotics or other medications • management	use of antibiotics only as therapy for individual animals or if the herd is infected, as preventative measure to be avoided	when > 25 kg, no medicine allowed (except natural remedy) **2**	use of antibiotics to prevent disease or treat the herd is forbidden **1**	use of antibiotics to prevent disease or treat the herd is forbidden **1**	no further guidelines **0**
Herd size limits • management	no guidelines	950 fattening pigs, max. 1.5 livestock units (LU) per hectare grazing land **2**	max. 3000 fattening pigs **1**	max. 950 fattening pigs **2**	no further guidelines **0**
Materials to keep occupied • housing	wood/hard rubber chain, straw, raw feeds required	adequate amount of straw for all animals **2**	Straw pellets and organic material in dispensers **1**	Long-stemmed straw in resting area **2**	varying methods **1**

Table 2 (continued): Set of Criteria and Evaluation for the Fattening Stage of Production

Criteria • Category	QS criteria	Neuland	Tierschutzbund Basic Grade	Tierschutzbund Premium Grade	Westfleisch Aktion Tierwohl
Space requirements [1]					
• housing					
Weight group 1	min. 0.35 m² (0,30 m² for older buildings)	≥ 0.5 m² for each animal	no further guidelines	no further guidelines	no further guidelines
Weight group 2	min. 0.50 m²	min. 0.3 m² (stall) and min. 0.5 m² (exercise area)	min. 0.7 m², with a min. 0,25 m² resting area	min. 0.5 m², with a 0.25 m² resting area, exercise area min. 0.3 m²	no further guidelines
Weight group 3	min. 0.75 m²	min. 0.5 m² (stall) and min. 1.0 m² (exercise area)	min. 1.1 m², with a min. 0.6 m² resting area	min. 1.0 m², with a 0.6 m² resting area, exercise area min. 0.5 m²	no further guidelines
Weight group 4	min. 1.00 m²	min. 0.8 m² (stall) and min. 1.6 m² (exercise area) **2**	min. 1.6 m², with a min. 0.9 m² resting area **1**	min. 1.5 m², with a 0.9 m² resting area, exercise area min.0.8 m² **2**	no further guidelines **0**
Resting area • housing	max. 15% of the area has perforations	solid floor covered with straw bedding **2**	solid floor (max 3% perforated flooring), minimal bedding (straw) or mats **1**	solid floor (max 3% perforated flooring), long-stemmed straw used for bedding over entire area **2**	no further guidelines **0**
Exercise area • housing	no guidelines	exercise area always available (except for weaners) **2**	no further guidelines **0**	contact to outside climate required (exercise area, front of stall open) **1**	no further guidelines **0**
Lighting • housing	min. 8 hr. lighting (80 Lux), in natural day/night rhythm	adequate daylight, openings for daylight comprise at least 5% of the stall area **1**	openings for daylight comprise at least 3% of the stall area, min. 80 Lux, natural day/night rhythm **1**	openings for daylight comprise at least 3% of the stall area, min. 80 Lux, natural day/night rhythm **1**	no further guidelines **0**

Source: authors' illustration according to [17, 18, 19, 20, 21, 22, 23], own evaluation

[1] Weight group 1 = to 30 kg live weight; weight group 2 = 30 – 50 kg live weight (Neuland 30 – 60 kg), weight group 3 = 50 – 120 kg live weight (QS 50 – 110 kg), weight group 4 = over 120 kg live weight (QS over 110 kg)

Table 3: Set of Criteria and Evaluation for the Transportation and Slaughtering Production Stage

Criteria • Category	QS criteria	Neuland	Tierschutzbund Basic Grade	Tierschutzbund Premium Grade	Westfleisch Aktion Tierwohl
Electrical aids to drive herd • management	the use of electrical aids to driving are to be avoided	electrical driving aids and impacting instruments are forbidden **2**	electrical driving aids and impacting instruments are forbidden **2**	electrical driving aids and impacting instruments are forbidden **2**	no further guidelines **0**
Transportation conditions • management	no guidelines	no further guidelines **0**	if temperature < 10° C, bedding w/ insulating material **1**	if temperature < 10° C, bedding w/ insulating material **1**	no further guidelines **0**
Transportation • management	max. 8 hr. w/o food and water	max. 4 hr. std. **2**	max 4 hr. std. or 200 km **2**	max 4 hr. std. or 200 km **2**	approx. 3 hr., no definite requirements **2**
Rest period • management	slaughter w/o unnecessary delay	min. 2 hrs. rest period after unloading **1**	no further guidelines **0**	no further guidelines **0**	no further guidelines **0**
Test data from slaughtering • management	documentation of slaughtering tests (changes to the heart, liver, lungs, diaphragm), monitoring of antibiotics, salmonella monitoring	no further guidelines **0**	when more than 5% abnormalities to the tail, more than 20% pneumonia rate -> consultation by the inventory veterinarian, more than 3% loss of animals/passage -> report to inventory veterinarian, documentation of abnormal animal behavior in the slaughterhouse **2**	when more than 5% abnormalities to the tail, more than 20% pneumonia rate -> consultation by the inventory veterinarian, more than 3% loss of animals/passage -> report to inventory veterinarian, documentation of abnormal animal behavior in the slaughterhouse **2**	health index from data of the governmental meat controller, visual control through the governmental veterinarians **1**
Controls • management	regular frequency of controlling, depending on presence of abnormalities **0**	at least once a year **0**	routinely, dependent on evaluation of risks **0**	routinely, dependent on evaluation of risks **0**	routinely **0**

Source: authors' depiction of [17, 18, 19, 20, 21, 22, 23], authors' evaluation

Based on the scoring in the Tables 1-3, the total number of points accrued as well as the percentage of maximal possible points is given in Table 4.

Table 4.
Comprehensive Evaluation of the Labels

Category	No. of Criteria	Max. possible points	Neuland		Tierschutzbund Basic Grade		Tierschutzbund Premium Grade		Westfleisch Aktion Tierwohl	
			Points	%	Points	%	Points	%	Points	%
Total	**28**	**56**	**43**	**77%**	**18**	**32%**	**25**	**45%**	**11**	**20%**
Management	16	32	22	69%	13	41%	16	50%	7	22%
Housing	12	24	21	88%	5	21%	9	38%	4	17%

Source: authors' calculations

The results support a clear ranking of the labels under analysis. The Neuland label ranks first with 77% of all possible points. The second and third places go to the labels of the German Animal Protection Society: the premium grade achieved 45% of the points; the basic grade only had 32%. Having 20% of the points, the “Aktion Tierwohl” of the Westfleisch places fourth. The same ranking of the labels resulted for the categories “management” and “housing”. In the process, it was noticeable that Neuland rated much higher in the category “housing” than its total evaluation would suggest. The labels of the German Animal Protection Society rate higher in the category “management” than in its overall evaluation. For the Westfleisch label, the subcategories only show small deviations from the overall evaluation.

The overall low rating of the "Aktion Tierwohl" label can be explained by the fact that only nine of the 28 chosen categories were represented by this standard. In addition, these usually only caused a slight improvement in comparison to the QS system which was taken to represent the market standard. In contrast, the Neuland label provides its own standards for 24 of the 28 relevant criteria. The basic standard of the German Animal Protection Society consisted of its own standard for 13 criteria which generally showed small improvements to the QS standard. The premium grade includes 15 criteria, including some with definitely higher standards than the QS.

Table 5 depicts the results of the evaluation of the individual labels in the various stages of production.

Table 5.
Evaluation of the Labels in the Various Stages of Production

Stage of Production • Category	No. of criteria	Max. Points	Neuland		Tierschutzbund Basic Grade		Tierschutzbund Premium Grade		Westfleisch Aktion Tierwohl	
			Points	%	Points	%	Points	%	Points	%
Breeding	**10**	**20**	**19**	**95%**	**4**	**20%**	**4**	**20%**	**6**	**30%**
• management	5	10	9	90%	4	40%	4	40%	3	30%
• housing	5	10	10	100%	0	0%	0	0%	3	30%
Fattening	**12**	**24**	**19**	**79%**	**7**	**29%**	**14**	**58%**	**2**	**8%**
• management	5	10	8	80%	2	20%	5	50%	1	10%
• housing	7	14	11	79%	5	36%	9	64%	1	7%
Slaughtering	**6**	**12**	**5**	**42%**	**7**	**58%**	**7**	**58%**	**3**	**25%**
• management	6	12	5	42%	7	58%	7	58%	3	25%
• housing	does not apply									

Source: authors' calculations

In the breeding stage of production, the Neuland label ranked highest, achieving 95% of all possible points. The Westfleisch label lagged well behind, holding the second place with a score of 30%. The German Animal Welfare Society labels together take the third place with 20% of the possible points. So far the German Animal Protection Society has only set its own standards for 3 of the 10 criteria; however, further standards for piglet production were in preparation at the end of 2013.

Neuland also was the leader in the fattening production stage, accruing 79% of the maximum number of points. As already seen in the overview, the second and third positions were occupied—with a definite gap between the

positions—by the labels of the German Animal Protection Society. The premium grade achieved 58% of the possible points; the basic grade only 29%. The Westfleisch label, however, only fulfilled 8% of the points. Only in two categories could a slight improvement in comparison to the QS standard be noted.
For the slaughtering production stage, the only relevant category is “management”. The labels of the German Animal Protection Society achieve 58% of the maximal possible points here to rank first, followed by the Newland label with 42% of the points. The label "Aktion Tierwohl" reached 25% of the maximum number of points. The average evaluation which Neuland received in this case can be explained by the lack of additional guidelines in the area of monitoring and evaluation of the carcass.

4 Discussion and Further Research Needs

The foregoing study confirmed that the label initiatives under consideration had not only already dealt extensively with the topic of animal welfare in livestock farming, but also had partially initiated measures to improve husbandry systems and management practices in various stages of production. However, upon research, each label currently still had weaknesses in individual areas which will need alleviation in the future. For example, the Neuland label, which received a highly positive evaluation, still had problems in monitoring and carcass evaluation. The guidelines of the Neuland label have been in existence since 1988. An adjustment to current monitoring standards of carcass evaluation has not yet occurred.
The German Society for the Protection of Animals has made significant strides in improving animal welfare in the stages of fattening and slaughtering. At the time of research there remained much potential for improvement in the production stage of breeding which would make their labels stand out even more from the QS standard. According to an announcement of the German Society for the Protection of Animals, towards the end of 2013 a committee was already working on the elimination of weak points in the areas of breeding and piglet production.
The label "Aktion Tierwohl" of Westfleisch is tainted by the reputation of being an animal welfare label conforming to industry desires [24]. Despite this, initial improvements in comparison with marketing standards can be noted in the area of pork production. However, the standards of these labels nevertheless lag to some extent distinctly behind more ambitious animal welfare labels which have not, as yet, been able to penetrate the market. If the Westfleisch enterprise desires to rehabilitate the reputation of its own concept, it must improve many criteria in its animal welfare label. This applies particularly to the fattening production segment in which only the criteria “water quality” and “materials to keep occupied” were able to provide slightly higher standards than in the QS system. On the other hand, Westfleisch is able to sell its “Aktion Tierwohl” products at very competitive prices only about 10 % above market standards. Therefore, the Westfleisch approach clearly demonstrates the goal conflict between higher animal welfare standards and price competitiveness, the latter also being highly relevant in the very cost competitive German meat market.
Literature often discusses the weighing of various categories in regard to their influence on animal welfare [25, 26]. The research carried out in this study revealed that giving varying weights to the categories “husbandry” and “management” will only lead to marginal differences in results and will in no case exert an influence on the ranking of the individual labels.
The demonstrated differences between animal welfare labels are an expression of a greater deviation in the area of process quality, in this case of animal welfare standards. Corresponding research should be done in the future on a wider scope of established animal welfare labels to include national, as well as international brands. This could provide an even more comprehensive benchmark for current approaches. This research could also help to provide a more detailed picture along the continuum from very low to very high animal welfare standards. The additional consideration of costs or prices could help to see which label provides more animal welfare for a given amount of money. Due to a limited willingness of consumers to pay more for more animal, this research could also help to see which label is best in utilizing limited budgets for increasing animal welfare standards.
Higher animal welfare standards lead to higher production costs which - when they are not supported by governmental subventions - have to be balanced by increased market prices. To what extent raising market prices is successful cannot now be conclusively determined for the majority of the labels under study. For consumers to be willing to pay increased prices, the additional costs arising from these higher standards which result in altered market prices should be transparently disclosed. For the most part, however, corresponding research on the costs of specific animal welfare standards has not yet been carried out. This would require additional studies taking into account the broad spectrum of alternative husbandry systems in modern livestock farming and economic as well as production know-how.
The evaluation of animal welfare presented here was based indirectly on the characteristics of the husbandry system and management practice. This approach is often seen critically. Instead, literature calls for the evaluation of animal welfare by using direct indicators of animal health and animal behavior [3, 27 and 28]. The guidelines of the labels

under study did not allow for such an evaluation. Future research should audit the livestock holdings in agricultural enterprises which were certified by labels analyzed in this study by using corresponding evaluation criteria for animal welfare and animal behavior.
Finally, the ordering of individual criteria to the named categories found in the literature has not been uniform [29]. Future research should address the question of which criteria could allow a direct measurement of animal health and particularly measure animal behavior. Preliminary criteria for auditing health and behavior issues were developed under the EU-financed Welfare Quality program [30].

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