EAAP 2010
61st Annual Meeting of the European Association for Animal Production
AUGUST 23RD - 27TH, 2010
HERAKLION - CRETE ISLAND
GREECE
Session 41

Is there a linkage between animal welfare in traditional Portuguese beef production systems and beef quality?

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Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Introduction

- Farm animal welfare: a growing concern for many consumers' in Europe ("Freedom Food" – UK)
- Consumption of animal friendlier products: motivated by the perceived link between animal welfare and the quality of the food product?
- Animal welfare: credence quality attribute, *i.e.*, cannot be evaluated by consumers
- Policy evolution: CAP reforms, White Paper on Food Safety

Introduction

- Additional growing evidence of direct and indirect impacts of animal welfare on food safety and intrinsic quality
- Livestock free from distress and able to express natural behaviour: healthier and more efficient production
- **However...**

Introduction

- Costs associated with higher animal welfare standards: training, adapting farm activities, certification costs
- Support measures and current premium prices haven’t been enough to offset higher costs
- Is there a market for animal friendlier products?
- Animal welfare needs to be a desired quality attribute for consumers to express effective demand

Objectives

Is there a market segment for welfare-based quality differentiated products?

- Define current *status quo* and legal framework for beef cattle welfare in the EU and in Portugal
- Linkages between “semi-extensive” systems and beef cattle welfare in Portugal.
- Can welfare friendly products be included in quality differentiating strategies for the Portuguese beef market?

Common beef production systems in Portugal

Brief description of the sector's facts and figures

- Two main production systems: "semi-extensive", and intensive.

Significant regional differences

- Alentejo: 40% of cattle; more animals per farm, lower stocking density
- North region: 23% of cattle; less animals per farm, higher stocking density

“Semi-extensive” beef production system

- Traditional and sustainable production systems
- Use of local resources: indigenous bovine breeds and spontaneous or seeded feedstuffs
- Autochthonous breeds: high rusticity, exceptional adaptation
- Some breeds: PDO

- Important role in environment management: maintenance of countryside, control of weeds and bushes, prevention of desertification

“Semi-extensive” beef production system

Characteristics	North/Center	South (Alentejo)
Production Systems		
Farm size	Small farms - 3 ha	Large farms - 300 ha
Average herd size (animals)	3	75
Pasture	Natural irrigation + Dry land	Dry land
Calving	Along the year	Two periods (Summer and Winter)
Slaughter age	7 months	18 - 24 months

Intensive beef production system

- No official data on intensive feedlots in Portugal
- Authors' experience; production units near large slaughterhouses. Mainly located in the Center. No significant dimension or even tradition
- Blue Tongue : movement restriction since 2004. This scenario led to the rise of several feedlots in the South region, near the large farms that formerly produced animals in semi-extensive systems.

Intensive beef production system

- Two main types, according to animal origin

	Dairy calves	Suckler calves
Genetic resources[1]	Holstein-Frisian	Mainly crossbred: imported x indigenous breeds
Feed[1]	Concentrate and straw (ad libitum). Sometimes maize silage. High energy and protein	
Produced quantity[1]	Mass supply. Standardized product	
Demand[1]	More generalized	
Weaning age (months)	2-3	6-8
Slaughter age (months)	9-12	12-15
Initial weight (kg)	100-120	250-350
Final weight	350-400	500-550
Carcass weight	170-200	300-325

Animal welfare definition and legislative framework

- A definition problem: different interpretations from different parties
- Conflicting aspects: economics, feasibility and environmental concerns
- Consumers include additional values: freedom to move and fulfil natural behaviour
- Retailers / producers: efforts to meet consumer concerns represent business opportunity profitably incorporated in production strategies

Animal welfare definition and legislative framework

- Conditions negatively affecting animal welfare interfere with intrinsic quality
- Improving animal welfare:
  - Reduce occurrence of tough or watery meat; bruising incidence, bone breakage and blood spots
  - Increase disease resistance, by decreasing immunosuppressive effect of chronic stress and need for antibiotics
- **Direct relevance on food quality and safety**

Animal welfare definition and legislative framework

- **“The Five Freedoms and Provisions (FAWC)**
- Animals’ welfare includes physical and mental state
- Proper production practices specific to: animal species, production systems and husbandry, climatic and farming conditions, housing and management methods, feeding, etc.
- Welfare assessment: scientific procedure that includes health, physiology, performance and behaviour measures

Portuguese systems' welfare status and possible control points

- Five Freedoms: each freedom decomposed into several control points and attributes.
- Control points (CP) are derived from risk factors identified during the strengths-and-weaknesses-assessment; points at different steps in production process where risks should be controlled.
- Animal welfare: exact standards or absolute objective threshold values may not be available

Portuguese systems' welfare status and possible control points

- On-farm assessment systems: converting science-based welfare measures into understood by all parties (namely the consumer)
- Method allows easier evaluation of different beef production systems
- Analysis undertaken for Portuguese "semi-extensive" and intensive production systems. Other production systems, countries or regions, may not fit this analysis.

Freedom from Hunger and Thirst

Criteria	"Semi-extensive"	Intensive
Feeding and nutrition program appropriate to their age, weight, and behavioral and physiological needs (RSPCA, 2010)	(+) Animals may not be dependent of hand feeding (-) Nutrition programs are more difficult to control and dependent of local resources and flora; quality dependent on the vegetative cycle and weather conditions	(-) Animals are completely dependent and feeding is completely controlled, which may prevent natural behaviour. Not enough fiber. (+) Concentrates have high energy and protein and most of the time, constitute well designed feeding and nutrition programs
Drinking water with appropriate chemical and bacteriological quality	(-) Difficult to guarantee when water comes from natural sources	(+) Water quality is easier to control.
Ad libitum feed and water (RSPCA, 2010)	(-) Difficult to guarantee as the animals are not observed as frequently	(+) Easy to guarantee with appropriate management
Feeding facilities and equipment cleaning and maintenance protocol	Non applicable	Depends on implemented procedures and protocols
Adult cattle and calves must be provided with fiber to allow them to ruminate, which must be of such quality and length so as to help avoid acidosis (RSPCA, 2010)	(+) It is always guaranteed , given the system's characteristics	(-) Animals are dependent on the fiber that is provided with feed
Avoid sudden changes in the type and quantity of food (RSPCA, 2010)	(-) Difficult to guarantee as pastures' quality depends very much on the local conditions and on the weather.	(+) Easy to guarantee with appropriate management

Freedom from Hunger and Thirst

- It can be suggested that in intensive systems it is easier to control food and water supply, and to guarantee proper animal nutrition.

Freedom from discomfort

Control Point	"Semi-extensive"	Intensive
Genetics	(+) Native breeds are usually more adapted to local conditions, such as temperatures and insulation, thus being less affected by such stress factors (-) Imported animals have more difficulty adapting to the new conditions	(-) The production system doesn't make use of genetic characteristics for assuring increased comfort (-) Imported animals have more difficulty adapting to the new field conditions
Stocking density and available space	(+) Easily guaranteed, given the system's characteristics	(-) Most farms tend to increase stocking density
Type of floor and bedding material Comfortable resting area	Dependent on geographic conditions and soil characteristics in which the animals are kept	Dependent on facilities' characteristics and the kind of bedding used
Thermal comfort	(-)Difficult where no shelters are available. Heat stress can be one of the most important welfare problems in southern Europe	(+) Easily achieved in properly built farms
Air quality	(+) Easily guaranteed , given the system's characteristics	(-) Noxious gas levels can be high
Animal waste and effluents	(+)Fewer environmental impacts	(-) Bigger environmental impacts
Lighting	(-)Difficult where no electrification is available	(+) Easily achieved in properly built farms

Freedom from discomfort

- Regarding the freedom from discomfort, no clear distinctions can be made between the two systems.

- However, environmental conditions may favour “semi-extensive” systems.

Freedom from pain, injury and disease

Control Point	"Semi-extensive"	Intensive
Daily observation of the animals	(-)Difficult to guarantee as the animals are not observed as frequently	(+) Daily feedlot operation
Rapid diagnosis and treatment	(-)Difficult to guarantee as the animals are not observed regularly	(+) Daily feedlot operation
Absence of injuries, disease and pain induced by management procedures	Depends on the Implemented procedures and protocols	
Mutilations (castrating, spaying, dehorning and tail docking	Depends on the Implemented procedures and protocols	
Prophylactic and therapeutic protocols	Depends on the Implemented procedures and protocols	
Biosecurity measures and rodent control plans	(-) More difficult to achieve, as the production system is more open to external factors	(+) More closed production system: biosecurity measures can be more easily implemented
Barn Hygiene	Only applicable if there are shelters.	Depends on the Implemented procedures and protocols
Carcass disposal according to current legislation	Depends on the Implemented procedures and protocols Sometimes difficult to comply with legally imposed timings	Depends on the Implemented procedures and protocols
Animal transport protocol	Depends on the Implemented procedures and protocols	

Freedom from pain, injury and disease

- Freedom from pain, injury and disease may be easier to assure in intensive systems, as long as proper handling and procedures are implemented.

- However, diseases like ruminal acidosis and respiratory disease are much more common in intensive systems.

Freedom to express normal behaviour

Control Point	"Semi-extensive"	Intensive
Characteristics of pens and equipments	(+) Only important when considering shelters	(-) Extremely important. Sometimes problems with ventilation
Facilities and equipment cleaning and maintenance protocol	Depends on the Implemented procedures and protocols	
Ease of movement	(+) Naturally achieved	(-) Impossible to achieve as the animals are permanently housed. Can be compensated by adequate stocking density
Expression of social behavior. Animals should be allowed to express natural, non-harmful, social behavior and natural behaviors, such as exploration and play	(+) Naturally achieved	(-) Very difficult to achieve expression of natural behaviors. Expression of social behavior, although always primary, can be enhanced by housing calves in group pens (Xiccato et al., 2002)
Foraging	(+) Naturally achieved	(-) Very difficult to achieve, as animals usually do not pasture.

Freedom to express normal behaviour

- Considering the freedom to express normal behaviour, “semi-extensive” systems are clearly animal friendlier

- Beef cattle can be considered to have high quality of life, freedom to move and to fulfil natural behaviours,

Freedom from fear and distress

Control Point	"Semi-extensive"	Intensive
Trained personnel Implementation of codes of practice	Depends on the Implemented procedures and protocols	
Good human - animal relationship. Absence of general fear, distress, Frustration	Depends on the Implemented procedures and protocols	
Boredom	(+) As animal interacts more with its surroundings they tend not to be bored	(-) Associated with the intensive production
Mixing of animals Group size. Stable groups	(+) Uncommon. Groups are generally stable as they result from animals weaned at the same farm and at the same time	(-) Very common, particularly at the latest production stages One of the main factors leading to disease situations in feedlots.
Weaning	(-) At the farm, at 6 months age, usually represents a stressful event.	(+)Less stressful event as animals are younger. Diary calves are less stressfully weaned
Transport protocols	Non applicable.	(-) The most stressful event after animal mixing
Handling facilities	Depends on the Implemented procedures and protocols	

Freedom from fear and distress

- Considering the freedom from fear and distress “semi-extensive” systems are clearly more animal friendlier
- Animals subject to less distress factors.
- **Overall analysis: no immediate identification of animal friendlier system**

Portuguese beef cattle welfare
Objective quality and user-oriented quality

- Consumers may value: lower environmental impact, animals being able to express natural behaviour, not being subject to high stocking densities
- Use of local native breeds: associations with cultural heritage and landscape preservation.
- Portuguese “semi-extensive” production systems: animal welfare characteristics consumers are interested in.

Portuguese beef cattle welfare
Objective quality and user-oriented quality

- Local breeds: more adapted to local conditions, more resistant to extreme temperature and insulation conditions, pastures quality and availability variations
- Animals reared in stable groups, mixing is unusual: avoids many stressful events and reduces contact with pathogenic agents.
- Positive welfare aspects of such production systems can be translated into beef intrinsic quality resulting in an increased experienced quality by consumers

Conclusions

- Portuguese “semi-extensive” beef production systems may have characteristics that, within the consumers’ perspective, should be explored.
- Features such as low stocking densities, natural animal behaviour and low environmental impact to be incorporated as credence quality attributes
- Consumers relate these attributes with safer, more genuine and higher quality beef.
- Potential intrinsic quality characteristics: increased experience quality for consumers.

Conclusions

- Certification costs could represent higher consumer prices and consumers' income plays a very important role
- Some consumers may be willing to pay more for quality beef, helping support through their demand specific production sectors.

- **There might be business opportunities in Portuguese beef market for different product variants associated with higher levels of animal welfare**