



# TARGET PORK QUALITY



## Evaluating pork eating quality

### A guide to good practice for taste panels

Taste panels are widely used in the meat industry for assessing eating quality. This brief document provides best practice guidelines aimed at maximising the benefit from regular taste panel assessments.

#### Potential applications

Taste panels are often used to monitor product quality, usually to comply with customer requirements or company quality control procedures, but properly conducted taste panels have many other potential uses:

- Assessing product variability
- Developing new products
- Determining product shelf life
- Benchmarking against competitors' products
- Investigating how changes in processing (eg chilling rate or ageing time) affect eating quality
- Assessing pork from different systems (eg organic and conventional)
- Detecting off-flavours or odours (eg boar taint)
- Assessing appearance in terms of colour, amount of drip, fat cover, or detecting PSE or DFD pork



Cutting of samples is a crucial part of sensory assessment

#### How can eating quality be measured?

Eating quality can be reliably assessed by using a small number of experienced assessors who evaluate the eating quality of meat on a regular basis. Good practice involves following standardised procedures and giving attention to detail at every stage from the selection of assessors, through sample collection and cooking, correct labelling, using appropriate scales and data analysis.



Samples must be cooked to a standard central temperature

#### Sample preparation

Cutting of samples is a simple but crucial part of sensory assessment. Accurate cutting is needed to ensure samples have similar dimensions. Chop/muscle thickness has a major impact on eating quality, as does orientation of the muscle fibres. Samples should be labelled using three digit random numbers, so the assessors have no clues to the identity of the samples.

Samples must be cooked to a standard centre temperature (eg 72°C). Previous work has shown that final internal endpoint temperature has a marked effect on eating quality.

- A purpose built facility is ideal for sensory assessment
- Individual booths separate from the cooking area prevent assessors conferring
- A heating block keeps samples warm
- Controlled lighting can mask colour differences
- Specialist software is available for entry of results and presentation
- Water and dry bread are available for palette cleansing between samples





# TARGET PORK QUALITY

## Evaluating pork eating quality – A guide to good practice for taste panels



A purpose-built facility is ideal for sensory assessment

### How many panellists?

Most research-oriented taste panels around the world have 8-10 assessors, sufficient to allow for the different responses of even trained individuals to the same sensory stimulus. The statistical analysis of the results identifies the 'assessor effect' and we want this to be much smaller than the 'treatment effect'. The number and length of times that a panel is required influences how many assessors are needed. For a one-off session, 6 is adequate. A long-term trial spread over many months requires 8-10 assessors, to allow for absences.

### What is a 'trained taste panel'?

It is important that the main components of eating quality (tenderness, juiciness, flavour, unusual odours etc) are recognised the same way by all the assessors. Training involves evaluating samples with extremes of these characteristics which allows the assessors to 'anchor' the upper and lower limits. For pork, extreme toughness is found in carcasses which have been cooled too quickly and the meat cooked to too high a temperature. Extreme tenderness is found in well aged, well marbled pork which has been cooked to a low internal temperature. Evaluating abnormal odours may involve sniffing the causative agents eg skatole and androsthenone, the compounds responsible for boar taint.

### How many samples in a 'session'?

The morning is a good time to hold panels; the performance of assessors seems to decline after lunch. There is a limit to how many samples can be assessed in a panel session because the sensory response declines as the number of samples increases (sensory fatigue). As a guide, four samples in a session is ideal (six as a maximum) with up to six sessions in a morning (ie 24 samples in all).

### What to measure?

Tenderness, juiciness and flavour are the three major attributes that determine eating quality. They can be assessed using different sensory techniques among which category scales (Table 1) or unstructured line scales (Table 2) are the most popular and useful.

**Table 1 Category scales to evaluate the eating quality of pork**

Assessors mark the category that best describes the sample. Scores of 1 to 8 are assigned to the various categories eg extremely tender is 8, extremely tough is 1.

Tenderness	Juiciness	Pork flavour intensity
Extremely tender	Extremely juicy	Extremely strong
Very tender	Very juicy	Very strong
Moderately tender	Moderately juicy	Moderately strong
Slightly tender	Slightly juicy	Slightly strong
Slightly tough	Slightly dry	Slightly weak
Moderately tough	Moderately dry	Moderately weak
Very tough	Very dry	Very weak
Extremely tough	Extremely dry	Extremely weak
Abnormal flavour intensity	Overall liking	
Extremely strong	Like extremely	(Overall liking is a 'hedonic' or subjective attribute, whereas the others are objective).
Very strong	Like very much	
Moderately strong	Like moderately	
Slightly strong	Like slightly	
Slightly weak	Dislike slightly	
Moderately weak	Dislike moderately	
Very weak	Dislike very much	
Extremely weak	Dislike extremely	

### How good is your panel?

Try the following test. Divide a pork loin into three sections and cook to internal temperatures of 65, 72.5 and 80°C. Cut samples into 5 x 2.5cm pieces, wrap in pre-coded aluminium foil and serve warm to assessors, ensuring assessors receive samples in different orders. Ask the assessors to rate the samples for texture, juiciness, pork flavour intensity, abnormal flavour intensity and overall liking using eight point category scales. The assessors should find systematic differences between the three samples, with the most tender and juicy samples at 65°C, and the most flavoursome at 80°C. Comparison of your results with those from the Bristol group would help benchmark your panel.



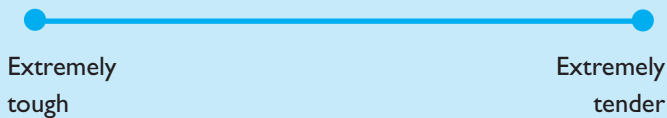
# TARGET PORK QUALITY

Evaluating pork eating quality – A guide to good practice for taste panels

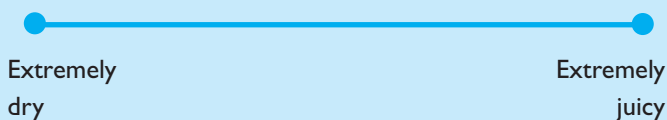
**Table 2** Line scales for assessing pork eating quality

Assessors mark a point on a 100 mm line that best describes the product being assessed. Values are measured (mm) from the left hand anchor point.

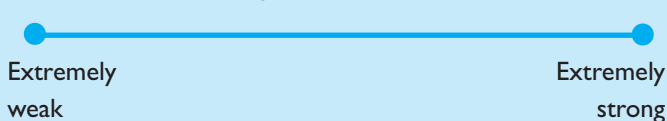
### Texture



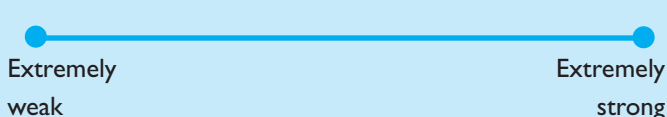
### Juiciness



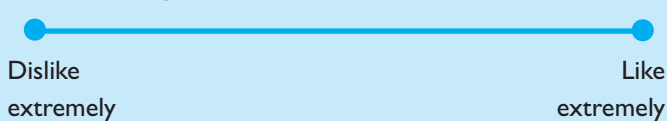
### Pork flavour intensity



### Abnormal flavour intensity



### Overall liking



*illustration not to scale*

## How many samples?

Testing a new procedure in the processing plant (eg a change in pig diet or chilling regime) requires about 20 pigs/samples to allow for variation between animals. Always include a 'control' group against which the new procedure is compared. Building up a body of data in the plant by sampling groups of pigs in this way allows trends over time to be established.

## Boar taint

An estimated 1 in 10 male pigs have boar taint, although it is more common in some pig breeds, particularly at older ages. Assessors can be trained to detect the off odours and flavours associated with boar taint. This might allow processors to identify the overall prevalence in a particular factory, or from an individual supplier.

## PSE and DFD pork

An estimated 1 in 7 pigs exhibit PSE characteristics (pale, soft and exudative pork). DFD characteristics (dark, firm and dry) are also seen in British pork, although in fewer numbers. Photographic scales can be used by assessors to identify slight or extreme PSE and DFD, allowing estimates of the overall prevalence to be made. Measurement of muscle pH and the amount of drip also provide information on PSE and DFD incidence and the effectiveness of the pork processing operation.

### Further information



For practical advice and assistance on setting up and running a taste panel, or help in maximising the potential of sensory analysis, please contact:

Geoff Nute  
Division of Farm Animal Science  
University of Bristol  
Langford  
Bristol, BS40 5DU

Telephone: 0117 928 9305  
email: [geoff.nute@bristol.ac.uk](mailto:geoff.nute@bristol.ac.uk)  
[www.vetschool.bris.ac.uk/meatquality/sensory](http://www.vetschool.bris.ac.uk/meatquality/sensory)

This document has been prepared by the BPEX Pork Chain Unit.

