

## **QUEENSLAND PORK QUALITY AUDITS**

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### **SUMMARY**

The level of pork quality in three Queensland pig processing facilities was assessed as part of the Pig Research and Development Corporation (PRDC) National Pork Quality Improvement Program (NPQIP). The program aims to achieve a 50% reduction in the incidence and commercial impact of pale, soft and exudative pork by determining the level of pork quality at each processing facility and recommending improvements.

A total of 1,366 carcasses was sampled from three processing facilities. Carcasses were sampled over three days at each facility, representing approximately 25 % of the kill for those days. Pork quality was determined by measuring pH and light scatter in the loin and ham of every carcass. Carcasses were described as either extensive soft and exudative, localised soft and exudative, reddish-pink, firm and non-exudative, localised dark, firm and dry or extensive dark, firm and dry. The processing operations from unloading to chilling were also appraised at each facility to identify ways of improving pork quality.

The overall level of soft and exudative and dark, firm and dry pork was 31.0% and 30.5%, respectively. The level of soft and exudative pork was lower than the national average and the level of dark, firm and dry pork was higher than the national average. Factors contributing to the incidence of soft and exudative and dark, firm and dry pork included inadequate resting of pigs before slaughter, holding pigs overnight without feed, excessive use of electric goads, long processing times and slow carcass chilling rates.

*Keywords:* pork, quality, PSE, DFD

### **INTRODUCTION**

Pork quality defects such as pale, soft and exudative (PSE) cost the Australian pig industry approximately \$23 million annually, because of drip loss, cured loss and downgrading (Paton 1992; Whan 1993). Dark, firm and dry (DFD) pork is also a problem because it is not visually appealing to consumers, can be tough, and has a shorter shelf-life than normal pork.

The National Pork Quality Improvement Program (NPQIP) aims at achieving a 50% reduction in the incidence and commercial impact of SE pork. This is being achieved by auditing production and processing establishments to determine the level of pig and pork meat quality and to recommend improvements.

The NPQIP comprises two stages. Stage one was a national audit involving four processing facilities, one in each of four states (Maynard 1996). Each processing facility was audited four times, with a six month interval between audits. The four audits were to determine if the level of pork quality had improved within each processing facility after implementing recommended changes.

Stage two of the project involved single audits of as many processing facilities as possible in every state. The Queensland audits, covering three major processing facilities, were conducted by PRIMEAT Consultancies (the former business unit of the Queensland Livestock and Meat Authority). These audits provided a 'snapshot' of each processing facility, determining the incidence of SE, normal, and DFD pork at each facility. This report includes the results of the Queensland audits.

### **MATERIALS AND METHODS**

A total of 1,366 pig carcasses was sampled from three processing facilities. The carcasses were sampled over three days at each facility and represented approximately 25% of the kill for those days.

Pork quality was determined by measuring muscle pH and light scatter in the loin and ham of every carcass. Carcasses were described as either localised SE (pH less than 5.6 in either the loin or ham), extensive SE (pH less than 5.6 in both the loin and ham), normal (pH between 5.6 and 6.0 in both the loin and ham), localised DFD (pH greater than 6.0 in either the loin or ham), or extensive DFD (pH greater than 6.0 in both the loin and ham).

The processing facilities and operations were also assessed, including lairage operations, stunning and slaughter, carcass processing and chilling. These assessments compare Queensland processing facilities to industry best practice (Trout 1993; Eldridge 1994) and the NPQIP commercial blueprint for quality (Reiser and Myler 1996).

## RESULTS

Overall, 31.0% of carcasses had some level of SE and 30.5% had some level of DFD pork. Queensland had a lower incidence of SE pork and a higher incidence of DFD pork than the first and fourth NPQIP national audits (Figure 1).

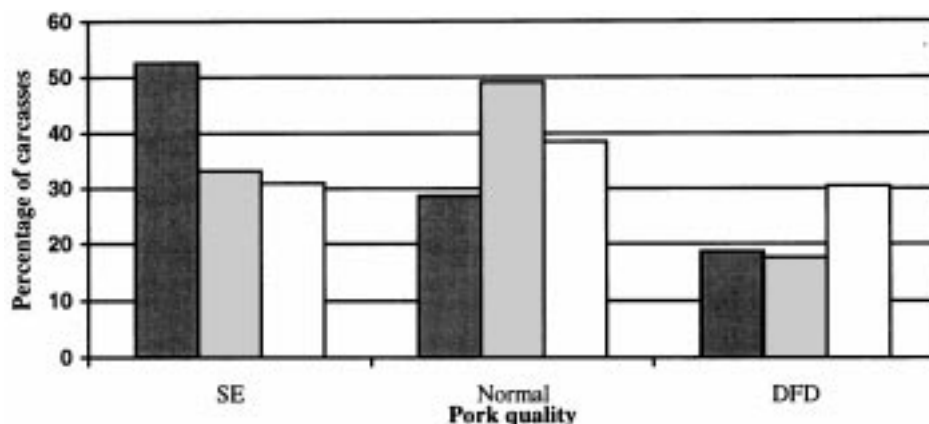


Figure 1. The pork quality in Queensland compared with the first and fourth NPQIP series audits ('hatched bars', NPQIP series one audits; 'shaded bars', NPQIP series two audit; open bars, Queensland audits). SE is soft exudative; DFD is dark firm and dry

The level of pork quality varied between processing facilities. Pigs processed at Abattoir A had the highest incidence of DFD pork, those processed at Abattoir B had the highest incidence of normal pork and those processed at Abattoir C had the highest incidence of SE pork (Table 1). There was a higher incidence of extensive SE than localised SE pork at all abattoirs.

**Table 1. The incidence of extensive soft exudative (SE), localised SE, normal, localised dark, firm and dry (DFD) and extensive DFD pork at three Queensland abattoirs**

Pork quality	Abattoir A n=389 Incidence (%)	Abattoir B n=726 Incidence (%)	Abattoir C n=251 Incidence (%)	Weighted average n=1366 Incidence (%)
Extensive SE	11.6	17.4	29.5	17.9
Localised SE	10.4	13.3	16.7	13.1
Normal	35.2	42.3	32.3	38.4
Localised DFD	20.4	13.3	12.4	15.2
Extensive DFD	22.4	13.8	9.2	15.4

The following factors were identified as possibly contributing to the incidence of SE and DFD pork in at the Queensland processing facilities.

### *Unloading facilities*

Stress during unloading can contribute to pigs yielding SE and DFD pork. The side panels of the unloading ramp at Abattoir B were rusted and in need of repair. Gaps appearing at the bottom of the side panels can cause the pigs to baulk and become stressed during unloading.

### Use of sprays

Heat stress can contribute to PSE. Spraying pigs upon arrival helps them to settle and recover from transport stressors. At Abattoir A, pigs were not sprayed upon arrival and at all abattoirs sprays were used at the discretion of the stockman; spray use was not related to air temperature. At Abattoir B pigs were shivering while the sprays were left on. This can contribute to DFD pork.

### Water availability

There seemed to be inadequate drinking points in the pens at Abattoir C. This can lead to fighting and stress.

### Time in lairage

Stressed pigs at slaughter are very likely to yield SE pork. Therefore, they should be well rested and recovered from transport stressors before slaughter. However, at all abattoirs, some pigs were not adequately rested before slaughter. On the other hand, at all abattoirs there were instances where pigs were held in lairage overnight without feed. Inadequate feeding can contribute to DFD pork.

Additional data collected at Abattoirs A and B was used to show the incidence of SE, normal and DFD pork from pigs rested in lairage for different lengths of time (Figure 2).

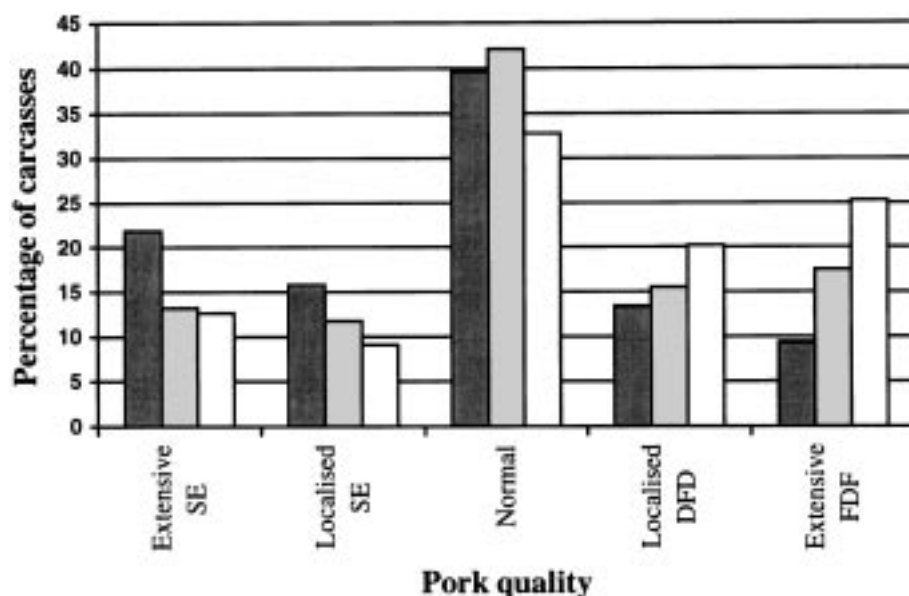


Figure 2. The pork quality of pigs held in lairage for less than 4 hours (hatched bars, n=288), between 4 and 23 hours (shaded bars, n=629), and longer than 23 hours (open bars, n=198) before slaughter at Abattoirs A and B

### Handling of pigs

Double handling pigs in lairage contributes to long-term stress, which increases the risk of pork becoming DFD. At Abattoir B pigs were double handled because of the design of the lairage facilities and the direction in which the gates opened. Pigs were stressed when handled immediately before slaughter at all abattoirs. The use of electric goads during the lead up to slaughter tended to be excessive.

### Double stunning

Improper stunning contributes to the incidence of SE pork. At Abattoir A pigs were sometimes double stunned and, occasionally, electrodes were placed on a pig's back to steady it for the sticker.

### *Processing times*

High carcass temperatures contribute to the incidence of SE pork. The longer it takes for carcasses to reach the chiller after slaughter, the greater the risk they will become SE. The average times from stunning to evisceration and from stunning to chilling at all three abattoirs were longer than the recommended maximum times.

### *Chilling regime*

Chilling carcasses quickly reduces the risk of them becoming SE. Carcass chilling rates were inadequate at all three abattoirs. The average air temperature before loading at all three abattoirs was above the recommended maximum and the average deep butt temperatures after two and six hours of chilling were above the recommended maximum. The slow carcass chilling rates were partly due to the chillers being overcrowded with very little space between the rails. In addition, at Abattoir C, hot and cold carcasses were mixed.

## **DISCUSSION**

Thirty-one per cent of pig carcasses surveyed in Queensland had some level of SE pork and 30.5% had some level of DFD pork. The level of SE pork was lower than the NPQIP national average and the level of DFD pork was higher than the national average.

There is scope for reducing the incidence of both SE and DFD pork. The main areas for improvement include the resting of pigs prior to slaughter, limiting the use of electric goads, reducing processing times and improving chiller efficiency.

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