Pork safety and quality through livestock welfare:
2. Pig welfare during pre-slaughter and stunning

Sp. Ramantanis¹, E.N. Sossidou² and A. Tserveni-Goussi³

¹ Technological Educational Institution (T.E.I.) of Athens, Department of Food Technology, Agiou Spyridonos Str., 122 10 Egaleo, Athens, Greece. Phone: +30 210 5385506, E-mail: ramadspy@teiath.gr. ² National Agricultural Research Foundation (N.AG.RE.F.), Animal Research Institute, Greece. ³ Aristotelian University of Thessaloniki, Thessaloniki-Greece

Summary: Pig welfare from farm to slaughter can be defined by the stress the animals undergo when faced with new environments. Recent reports concerning animal welfare during transport and at the time of slaughter in Greece indicate that corrective actions should be taken by the Greek authorities in particular to supervision and monitoring the situation of transportation, resting and stunning of animals. Slaughter pigs are currently subjected to a number of handling practices from the moment they leave their fattening pen until they are stunned at slaughter. New management practices taking into account animal welfare during pre-slaughter and stunning (fasting, loading, transport, lairage, stunning system) must be adopted in order to limit animal stress from farm to slaughter. Some of these practices (equipment, logistics, training of the personnel) to be implemented are discussed. Apart of the issue of the animal welfare, the lack of adequate preparation of pigs on farm (fasting) and the use of poor handling systems throughout the pre-slaughter period also lead to carcass depreciation and meat quality defects (PSE, DFD) which reflect in great economic losses for the industry.

Keywords: pigs; ante-mortem handling; critical points; PSE; DFD

Introduction: Major deficiencies in the field of animal welfare during transport and at the time of slaughter in Greece were recorded by the FVO/EC in 1998 and 2000 (Report 1998, 2000). New measures taking into account animal welfare during pre-slaughter and stunning (fasting, loading, transport, lairage, stunning system) must be adopted in order to limit animal stress from farm to slaughter (Ramantanis, 2002).

Critical points within the pre-slaughter period:
I. Farm: Preparation for transport/ Loading: Currently, a feed withdrawal of 16-24 h before slaughter is recommended in practice (Ramantanis, 2002). Fasting for at least 12 h before loading decreases the risk of mortality during transport (Chevillon, 2000). Long fasting periods, when associated to long transports or lairages, would tend to decrease the incidence of PSE meat and increase the prevalence of DFD meat (Eikelenboom et al., 1991). Loading pigs onto the truck is considered the most critical stage of the transport stage. The use of a lift makes the pigs easier to handle and prevent the handlers from using coercion on them. If a ramp is necessary it should have an angle of < 20° (Christensen et al., 1994).

II. Transport: Vehicle design/ Stocking density/ Transport time and distance/ Unloading: To optimize the transport conditions, the transport vehicle should have a covered and insulated deck (ceiling and sides), effective mechanical ventilation and ventilation openings both low down and high up semi-automatically adjusted from the driver’s cabin on the sides, as well as hydraulic upper deck, mobile compartment dividers and a non-skid rubber surface on the floor and a sprinkling equipment (Christensen and Barton-Gade, 1996). The current legislation in Europe (95/29/EC) specify that loading density for pigs of around 100 kg should not exceed 235 kg/m² (0.425 m²/100kg) and that a maximum increase of 20% (0.510 m²/100kg or 196 kg/m²) may also be required depending on the meteorological conditions and journey time. In most EU countries stocking densities range from 0.35 to 0.39 m²/100 kg and go up to 0.43-0.50 m²/100 kg in Germany. Market pigs can experience higher mortality (heat stress), injuries (bruises) and lower meat quality if the space allowed is not appropriate. In a EU survey, the majority of pigs within all countries travelled less than about 3 to 2 h with average distances of 100 km or less. (Barton-Gade,
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2001). Transports lower than 2h increased the severe PSE meat incidence by 2.3% in Spain, whereas, pigs transported >2h may be more likely to develop DFD meat (Gispert et al., 2000). The use of the hydraulic lift to unload pigs increases the easiness of handling and shortens the off-load time.

### III. Slaughterhouse: Lairage/ Moving pigs to stunning/ Stunning methods and their impact on welfare:
Under normal conditions of ambient temperature and humidity a resting time of 2-3 hours in lairage pens is usually regarded as a fair compromise between animal welfare, skin blemish score, meat quality and abattoir economics (Warriss et al., 1998). The movement of pigs up to the stunning point is very stressful because they are handled fast and in small groups. To decrease this stress a new low stress system (LSS) has been developed, which incorporates smaller pens holding only 15 pigs and automatic push gates to move the animals. Before the stunner the groups are divided into three groups of 5 pigs each for CO2 – stunning (Barton-Gade et al., 1992). Whatever electronarcosis or cardiac-arrest system are used, the animal welfare must always be assured (Chevillon, 2000). The LSS system promotes the animal welfare whereas the CO2 – stunning reduces skin damage, blood splash and PSE incidence in comparison to electric stunning (Channon et al., 2002).

### Conclusions:
New management practices taking into account animal welfare issues from farm to slaughter must be adopted at each production segment (farmer, transporter, packer). In the antemortem period, good welfare usually results from careful handling of animals that reduces stress and trauma. In contrast, poor antemortem handling leads to stress and results in poorer meat quality. Appropriate training and information related to animal welfare should be provided for all relevant veterinary personnel so that the official veterinary staff can check the application of Animal Welfare legislation professionally.

### References: