



HEALTH

Appendix 1: Pre-abattoir factors which can cause variation in killing out percent

What is understood by killing out percent?

Killing-out percent (KO%), also known as dressing percent, is important to pig producers since it determines how much saleable carcass weight is obtained from the live pig weight.

KO% is expressed as the weight of the carcass in relation to the weight of the live pig immediately before slaughter. The most valuable part of the pig is the meat contained in the carcass. Producers are therefore paid on the weight of the carcass and an assessment of its leanness, rather than the weight of the live animal. Normally, the KO% ranges from 72–80%. In the UK, the average reported KO% value in the last decade was 75–76%.

$$\text{KO\%} = \frac{\text{Carcass weight (before cooling)}}{\text{Liveweight (before slaughter)}} \times 100$$



Ensure optimal fasting period: 8-12 hours

Minimise pre-slaughter stress

Minimise carcass weight loss between final feed and slaughter

Maximise saleable carcass weight in relation to liveweight

Factors to consider when comparing killing-out values

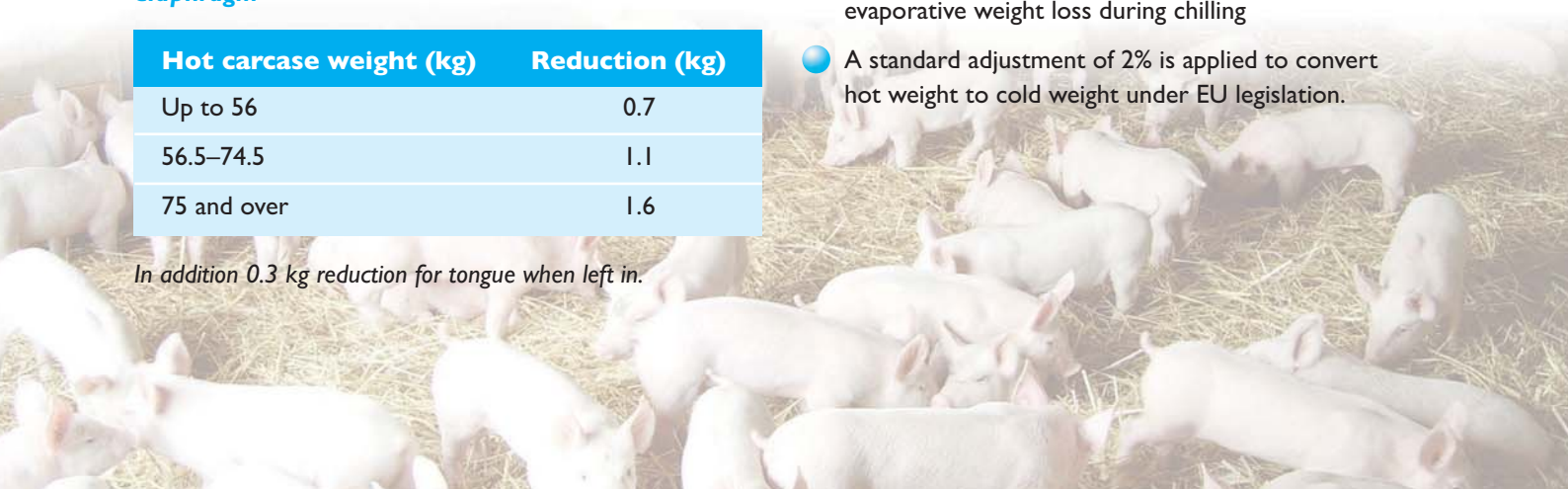
- The EU definition of the carcass is “the body of a slaughtered pig, bled and eviscerated, whole or divided down the mid-line, without tongue, bristles, hooves and genital organs, but with flare fat, kidneys and diaphragm”
- Muscle and fat are the most important components of a carcass. In the UK the flare fat, kidneys and diaphragm may be removed and the tongue may be left in, with the application of approved adjustments to the weight

Carcass weight reductions for flare fat, kidney and diaphragm

Hot carcass weight (kg)	Reduction (kg)
Up to 56	0.7
56.5–74.5	1.1
75 and over	1.6

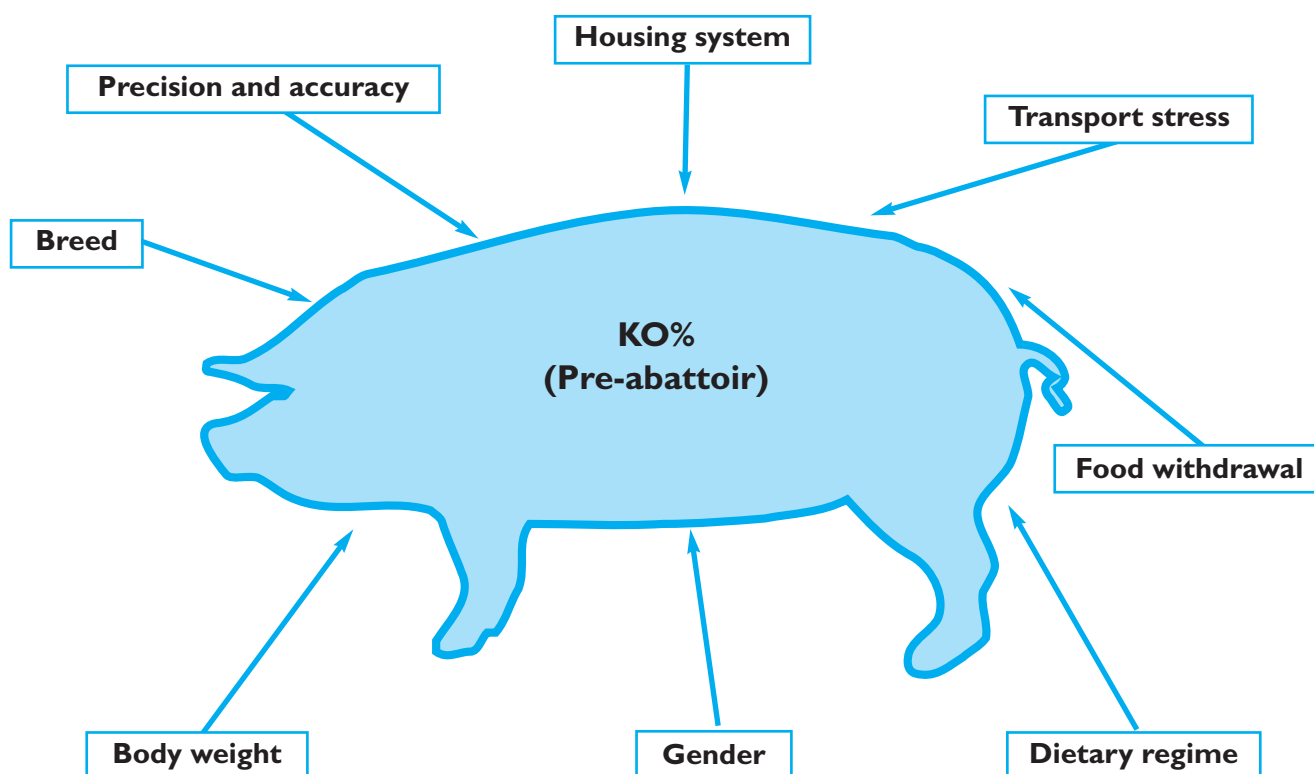
In addition 0.3 kg reduction for tongue when left in.

- The time of measuring liveweight greatly affects the KO%. If the pigs are weighed after feeding or before despatch from the farm, the liveweight will be around 5kg greater than if the pigs are weighed after 24 hours without food or just before slaughter. So if you are comparing feeds or genotypes be sure to weigh at a consistent time
- Additional trimming in the abattoir for health reasons, eg abscesses and pleurisy will reduce carcass weight and therefore KO%
- In some cases the carcass weight is measured after cooling rather than before cooling. In these cases, the KO% will be also affected, as a hot carcass will weigh 1.5–2% more than a cool carcass because of the evaporative weight loss during chilling
- A standard adjustment of 2% is applied to convert hot weight to cold weight under EU legislation.



Which pre-abattoir factors contribute to KO%?

The main pre-slaughter factors contributing to the KO% are those that affect the pigs' liveweight at the moment of slaughter.



How can these factors be optimised?

Precision and accuracy in weighing pigs

Get as accurate a weight as possible both for the live pig and for the carcase. Remember that most weighing scales round down the weight, ie from 75.4–75kg or from 75.6–75.5kg. Ideally use a weighing scale able to record small rounding down weights (to the nearest 0.2kg rather than to the nearest 0.5kg). Service and calibrate all weighing equipment regularly, as per manufacturers guidelines.

Breed

The selection for improved carcase muscularity over the years has resulted in a breed effect on KO%. In a study, Pietrain crosses, Belgian Landrace crosses and Duroc had greater KO% than Large White pigs by +1.8, 1.9 and 2.1% respectively. The Belgian Landrace and Pietrain pure breeds had a much higher KO%, +3.8 and 4.1% respectively. Traditional pig breeds, such as the Gloucester Old Spot or Tamworth, display the lowest KO% of all, around 2.5% lower when compared with Large White pigs. The differences are due to the fact that the well-muscled meat type breeds have lighter non-carcase component weights.

Body weight

Normally, the heavier the pig the better the KO%. This is because the main components of the pig carcase, muscle and fat, are later developing than the parts of the pig that constitute the offal, such as the intestinal tract, heart and

lungs. Therefore, older and heavier pigs will have a better and higher KO%. As Large White pigs increase in weight from 70–120kg, the KO% increases by 5% – a 1% increase in KO% per 10kg liveweight. In another study, liveweights of 70, 90, 110 and 130kg produced KO%s of 68.5, 70.4, 72.3 and 73.4 respectively.

Gender

Entire males have around 1% lower KO% than castrates and around 1.5% lower than gilts, this is due to differences in the weight of the reproductive tracts, in particular the testes which are components of the non-carcase parts.

Dietary regime

Both the level of feeding and the composition of the diet have an effect on KO%. Diets with high levels of fibre, which are relatively indigestible, reduce KO% while those with a high nutrient density increase it. These results are mainly due to differences in the weight of feed in the gut; high nutrient density means less feed weight. Ad libitum feeding increase KO%, possibly because it increases fat content.

Housing system

Pigs housed on straw have a lower KO% than those in fully slatted systems.

Food/water deprivation prior to slaughter

Prolonged food deprivation can be a major factor in reducing KO%. If a pig is deprived of food it will mobilise body tissues to provide energy for maintaining the vital functions of the body. More weight loss will occur if the animal is subjected to greater energy demands, such as those needed to thermoregulate or to maintain balance during transport. In addition, long periods of fasting lead to significant losses in the weight of edible offal, particularly the liver.

- Liveweight is lost almost immediately after feed withdrawal, at a rate of between 0.12 to 0.20% per hour. A large part of this loss is attributable to losses of urine and faeces
- Carcase weight starts decreasing as early as 9 hours after feed withdrawal at a rate about 0.1% per hour. If water is not available during the whole period of fasting, the rate of loss tends to be higher.

Fasting pigs for 24 hours can result in a loss of 3.8% of their initial liveweight and 2.1% of carcase weight in comparison with a fasting period of only 4 hours. Fasting pigs for 48 hours results in a 7.2% loss in liveweight and a 4.4% loss in carcase weight. Under a practical scenario, with pigs slaughtered at 90 kg liveweight and after 24 hours food withdrawal, a loss of between 0.8 and 1.6 kg of potential carcase yield might be expected. This can be translated to a loss of value of more than 1 pig for every 100 marketed! The optimal fasting period is 8–12 hours.

Transport stress

A major pre-slaughter stress is the transport of animals from the farm to the abattoir. It has been found that the carcase weight of pigs transported for 6 hours can be reduced by 1 kg, corresponding to a 2% reduction in KO%. For longer journeys, up to 30 hours the carcase weight can be reduced by 4 kg. This weight loss increases even further with low relative humidity, with high temperatures and with high stocking densities during transport. A 40% increase in stocking density (from 210 kg/m² to 299 kg/m²) can result in up to a 3% reduction in KO%.

**How much improvement can be expected?**

- Farming practices vary greatly between pig farms. The room for improving KO% therefore, depends on current practices and on how easily the adoption of new practices can occur. There is no universal combination of factors (eg breed, feed type, fasting regime, transport conditions) at farm level which will enhance KO% on every farm. Each farm should work out where it stands and possible areas for improvement should be identified
- Focus on ways to maximise carcase weight in relation to liveweight. Breed, sex and liveweight are important but if these are constants the major influence is the amount of feed in the gut and whether the pig loses carcase weight as a result of stress before slaughter. Too much feed in the gut reduces KO% but too long a fasting period causes carcase weight loss and may also compromise pig welfare. Ensuring a correct fasting period (8–12 hours) and minimising pre-slaughter stress are the most straightforward ways to enhance KO%.

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