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INTRODUCTION

The qualities of meat - its composition, nutritional value, wholesomeness and consumer acceptability - are largely determined by the events and conditions encountered by the embryo, the live animal and the postmortem musculature. The control of these qualities, and their further enhancement, are thus dependent on a fuller understanding of the commodity at all stages of its existence – from the initial conception, growth and development of the organism to the time of slaughter and to the ultimate processing, preparation, distribution, cooking and consumption of its meat.

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sampled in the study can be linked back to their sire. If this condition isn't applied then the results
may well reflect sire effects more than breed effects and the difference impossible to determine.

Another common problem in meat and food science is the lack of replication and also confounding.
This is illustrated with two examples below taken from submitted papers:

Example 1
A total of thirty crossbred male lambs, single born in June were used in an experiment to compare
three production systems (12 lambs allocated per system) and the subsequent effects not only on
growth and carcase traits, but also meat quality traits. Lambs of the three production systems were
weighed fortnightly. When a 35kg live weight target was achieved the lambs weighing >35kg were
transported to an abattoir. Lambs were slaughtered after an overnight lairage without feed, but free
access to water.

There are a number of issues with the design.

No mention was included in the paper as to whether the 36 lambs used in the study (a) were randomly
selected from a population; or (b) were randomly assigned to the three treatment groups. It was
assumed by the reviewer that they were randomly selected and assigned. The animals within each
group were run together, but separately from the other two groups. Hence there is no replication of
treatment group. Each lamb in a treatment group in the study is subjected to a specific production
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a different establishment. Thus treatment group is not replicated which is necessary to assess the
variability of a particular production system under different conditions. The other major issue with
the design is that, at fortnightly intervals, lambs were weighed and lambs exceeding 35 kg were
slaughtered. Hence not only were the treatment groups not replicated, they were also confounded
with slaughter age/day and for meat quality traits like pH and colour it meant slaughter day effects
could arise. With such small numbers per treatment group slaughter day could not be effectively
accounted for in the analysis.

Example 2
Hams were produced with five decreasing levels of phosphate in combination with 5 increasing levels
of thyme. All formulations were applied to a single batch of pig meat. Each formulation produced
one mixture which was vacuum stuffed into plastic casings to produce four ham 'replicates'. These
were cooked in a water bath.

This method produced pseudo replicates (Hurlbert 1984, 2009; Maindonald 1992). The cooked hams
are subsamples of the pig mixtures of each formulation. The ham to ham (sub-sample) variability does
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