USE OF QUALITY CONTROL CHARTS FOR MONITORING BEEF CARCASS CHARACTERISTICS

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Quality control charts are used routinely in manufacturing industries and other areas for monitoring product quality and highlighting significant departures from quality targets or long-term means as they occur. This paper considers their use for monitoring meat quality, in particular for monitoring the quality of carcasses supplied for boxed beef for export to the Japanese market.

Control charts are the basic tools in statistical process control (SPC), and an important element of Total Quality Management (TQM). However they have been seldom used for monitoring beef carcass characteristics, even though these often need to meet market specifications. Data are available to the cattle producer on 'feedback sheets', but are often under-used because of the difficulty in relating these to other data from the same producer and in linking them to management practices.

A wide variety of charts is available (Montgomery 1991). The most common are Shewart charts in which mean values for an attribute or percentage compliance are plotted against time and points which deviate significantly from targets are highlighted. This allows problems to be quickly identified and corrective action to be taken.

Slaughter floor and chiller assessment data were collected for 79 lots of cattle killed over 20 months for export to Japan as boxed beef. All cattle had been fed in the same feedlot 100 days and were slaughtered at the same abattoir. Each lot contained approximately 80 cattle. The operator's specifications covered carcase weight, dentition, P8 fat depth, meat colour score, fat colour score, bruising and muscle score.
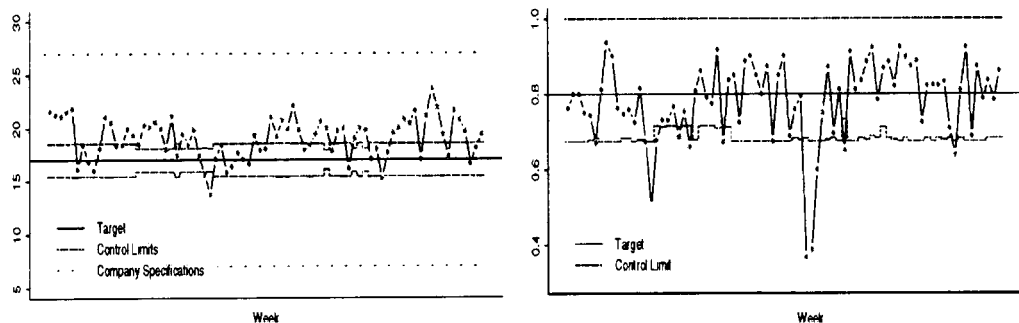

Figure 1. Weekly variation with time in mean P8 fat depth (mm) (left) and in the compliance with all company specifications (right)

The control chart for mean P8 fat has a target mean of 17 mm and typical standard deviation of 5.4 mm. It shows mean values are generally above their control limit and too high to achieve satisfactory lot compliance with the company specifications of 7 to 27 mm.

Overall, 78% of all bodies complied with all specifications, with carcass weight and P8 fat responsible for most non-compliance. The Shewart chart for compliance with all specifications, with target compliance of 80%, shows two periods in which compliance is consistently low and four other lots which indicate problems.

Generally, such quality control charts identify individual lots and series of lots for which departures from targets are more than just chance variation. They should be useful both for producers, indicating needs for change to practices, and for operators, warning of problems in meeting market requirements or with particular suppliers.

MONTGOMERY, D.C. (1991). 'Introduction to Statistical Quality Control' (Wiley: New York).