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# Probing beef cattle to predict carcass fatness

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## Quick Facts

- The beef cattle backfat probe was developed as a more objective preslaughter estimate of carcass fat thickness.
- Consistency of technique, with respect to animal restraint, probe site selection and method of probing, is critical to accurately compare animals.
- The preslaughter probe effectively ranks animals according to differences in carcass fatness; correlations between live probe and carcass measure of fatness are high.
- The live fat probe is more accurate in trimmer animals.
- Selection based on minor differences in the live probe is not recommended; the backfat probe should be used to identify those animals undesirable in composition.
- Primary purpose of the live fat probe is to identify differences in composition among bulls fed relatively high energy rations at 12-15 months of age, weighing 1,000-1,300 pounds (454-590 kilograms).

## Method of Probing

**Probe selection.** Commercially available beef cattle backfat probes differ little in design. Primary consideration should be given to durability. Cost is variable (approximately \$30).

**Animal restraint.** Cattle are individually restrained in a cattle squeeze chute that is tightened to approximately the same degree for each animal. The animal should be standing in a relatively normal position before the probe is inserted. Consistency of technique is critical to accurately compare animals.

**Probe site determination.** Probe site should correspond as closely as possible to the subsequent measure of fatness in the carcass. Carcass measurement of subcutaneous fat thickness is obtained between the 12th and 13th ribs, three-fourths of the length of the longissimus muscle (rib eye) from its medial edge (bone-edge).

In the live animal, the 13th rib is located by palpation and a reference point is established approximately 4 inches (10 centimeters) from the midline, between the 12th and 13th ribs. Adjustments of the reference point are necessary to compensate for differences in frame size; approximately 3 inches (8 cm) and 5 inches (13 cm) for small- and large-framed, respectively.

**Probing.** After determining the appropriate probe site, the animal's hide is punctured with a trocar and cannula (calibrated to compensate for .25 inch—6 millimeters—of hide thickness). The trocar is removed and a stainless steel probe inserted through the cannula until it contacts the connective tissue sheath surrounding the muscle. For the inexperienced technician, identifying contact with the connective tissue is the most difficult aspect of probing. This step in the process is comparatively subjective, although, with experience, the difference in resistance to probe penetration between fat and connective tissue becomes more clearly defined. The subcutaneous fat thickness measurement is recorded from a metal ruler attached to the probe.

The need to improve overall efficiency of beef production and increased consumer demand for lean beef necessitate selection and production of beef cattle with less trimmable fat. The rate at which the beef cattle industry can progress toward the production of a leaner product ultimately is influenced by how accurate methods are in identifying differences in fatness among live cattle.

Visual appraisal usually has been the principal method of evaluating differences in fatness among market and breeding cattle. In recent years, skepticism regarding the validity of visual evaluations plus the need to quantify differences in fatness resulted in the development of a more objective preslaughter measure (subcutaneous fat probe), which is intended to improve the accuracy of estimating fat thickness.

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## Accuracy

In a study at Colorado State University (*Journal of Animal Science*, January 1983), 140 yearling feeder steers were used to investigate the accuracy of the live fat probe in predicting carcass fatness. The steers represented a variety of breeds and were slaughtered at 28-day intervals during a 140-day feeding period. Consequently, the steers varied extensively in fatness and stage of growth at the time of slaughter.

The day before slaughter, steers were restrained in a chute. An experienced technician measured fat thickness on the left side of each animal using a commercially available fat probe. The technician observed carcasses in each successive slaughter group to check the accuracy of the procedure. The probe normally leaves a minor bruise on the carcass making it easy to evaluate how closely the live and carcass measurements of fatness correspond.

Correlations between preslaughter probe and both measured and adjusted carcass fat thickness were quite high (.81 and .86, respectively). The correlations indicate that the probe was effectively ranking animals according to differences in carcass subcutaneous fat.

When accuracy was evaluated within specific levels of fatness, the live fat probe was decidedly more accurate in trimmer animals. Steers with less than .30 inch (7.6 mm) of fat had a high degree of accuracy. There was a sharp reduction in accuracy among steers that exceeded .60 inch (15.2 mm).

## Application

The purpose of preslaughter estimation of carcass fat thickness is to identify differences in carcass composition in prospective breeding cattle and to reflect differences in value among market steers and heifers.

The fat probe has been widely accepted and is used extensively in central bull test stations. The primary use of the probe should be for assessing differences in fatness among bulls fed a relatively high-energy ration, weighing 1,000 to 1,300 pounds (454-590 kilograms) and approximately 12 to 15 months of age. Bulls usually will have approximately .20 inch (5 mm) less subcutaneous fat than their steer counterparts at similar weights.

The skill of the individual technician is critical in the accuracy of the fat probe. Training should include at least a minimal understanding of carcass evaluation and preferably observation of carcasses after probing.

The beef cattle backfat probe can reflect differences in carcass fat thickness with a high degree of accuracy. However, selection of cattle for replacement based on minor degrees of difference in probe reading is not recommended. Probe data should be used with other performance information to identify animals with undesirable composition. Accuracy of the probe appears to be highest in the range of fat thickness normally encountered along prospective breeding cattle and market cattle that excel in cutability.