1997

Field Implementation of Ultrasound Beef Quality Grading Technology: A Progress Report on Technology Transfer

V. R. Amin
Iowa State University

D. E. Wilson
Iowa State University

G. H. Rouse
Iowa State University

Extension Number: ASL R1326

Field Implementation of Ultrasound Beef Quality Grading Technology: A Progress Report on Technology Transfer

Abstract
Iowa State University's technology of ultrasound prediction of intramuscular percentage of fat in Longissimus dorsi muscle of live beef cattle has been integrated into a software program, copyrighted by the ISU Research Foundation, Inc., and licensed to a commercial company. ISU has ported its workstationbased research software components to a PC-based single software module for field use. This module is being integrated with the scanning and batchprocessing software developed by the licensee. This progress report summarizes the current status of ISU's technology transfer.

Keywords
ASL R1326

Disciplines
Animal Sciences

Field Implementation of Ultrasound Beef Quality Grading Technology: A Progress Report on Technology Transfer

A.S. Leaflet R1326

V. R. Amin, associate scientist, Center for Nondestructive Evaluation and Animal Science,
D. E. Wilson, professor of Animal Science, and
G. H. Rouse, professor of Animal Science

Summary

Iowa State University's technology of ultrasound prediction of intramuscular percentage of fat in *Longissimus dorsi* muscle of live beef cattle has been integrated into a software program, copyrighted by the ISU Research Foundation, Inc., and licensed to a commercial company. ISU has ported its workstation-based research software components to a PC-based single software module for field use. This module is being integrated with the scanning and batch-processing software developed by the licensee. This progress report summarizes the current status of ISU's technology transfer.

Introduction

Prediction of intramuscular percentage of fat (IFAT) as the most important attribute in beef quality has gained much attention over the past few years. An objective evaluation of beef quality has been a high priority objective in beef industry to achieve a long-desired goal of value-based marketing. Iowa State University has contributed significantly toward this goal, particularly in the area of ultrasound techniques for predicting the IFAT from live animals as well as carcasses. Reports in this and past issues of ISU's Beef Research Reports provide details on the progress in this area.

Ultrasound (digitally acquired images) and actual IFAT (chemically extracted) data have been collected over the past five years from the *Longissimus dorsi* muscles of more than 1,000 animals. Several signal- and image-processing technologies and statistical methods have been applied to develop models for predicting IFAT. The validation tests of the models have shown very encouraging results with good accuracy. This technology is now being commercialized for field use, and this progress report summarizes the current status of ISU's technology transfer.

Technology Transfer

Iowa State University's technology in ultrasound prediction of IFAT in live animals has been integrated into a software program which is copyrighted by the ISU Research Foundation, Inc. This technology has been licensed to Corometrics Medical Systems, Inc. (CMI), Wallingford, Connecticut. Critical Visions, Inc. (CVI), Atlanta, Georgia, is primarily responsible for developing the commercial versions of the scanning and data-management components as well as all user-interface-related software. ISU has ported its workstation-based research software components to a PC-based single software module. This module will be integrated with the scanning and batch-processing software developed by CVI. This modular approach has proved very efficient in development and will also provide great flexibility in upgrading the different modules as the technology further improves.

Field use of the software for prediction of IFAT

The complete system consists of hardware and software for scanning and processing. The hardware is similar to equipment most technicians typically use, i.e., an ultrasound real-time scanner (Aloka 500V®) a portable IBM-compatible computer, a frame-grabber (Cortex-I® or CX100® by Image Nations, Inc.), and an external video monitor. The major components of the software for IFAT prediction include a scanning module (developed by CVI), a batch-processing module with related database utilities (developed by CVI), and an image-processing module for IFAT prediction (developed by ISU). These components are well integrated for ease of use, efficiency, and flexibility. The scanning module allows a technician to digitally acquire ultrasound images in the field. A longitudinal image of the *Longissimus dorsi* muscle across the 10th, 11th, and 12th ribs is used for IFAT prediction. A rectangular area between and above the ribs is selected by positioning a "box" on the image display using a mouse or arrow keys. The image and location of the box are stored (along with other relevant information) in database files for later processing. After a scanning session, a batch process is started which predicts IFAT values for each longitudinal image scanned; the results can then be printed. This batch process, once started, does not require user interaction. This procedure allows a technician to collect good images during a scanning session without the interruption and delay of processing each image. Several reporting and database options also are included in the complete software package.

The technician's skills and care in collecting good images are extremely important for valid use of this technology. Field technicians must exert due care in following the scanning protocols and acquiring the best quality-image from the *Longissimus dorsi* muscle. Also, scanning equipment or power-supply-related electrical interference must be avoided because such problems introduce "noise" patterns in the captured images and may provide false predictions.

Implications

ISU's technology for predicting IFAT in *Longissimus dorsi* muscle of live beef cattle is now being commercialized and soon will be available for field use.