

学 位 論 文 要 旨	
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題 目	Studies on Establishment of Early Prediction and Objective Evaluation of Meat Quality in Beef Cattle (肉用牛における肉質の早期推定技術の確立および客観的評価に関する研究)
<p>This study was conducted to develop techniques for the early prediction and objective evaluation of meat quality in beef cattle production from the viewpoint of beef consumers and producers, and to help resolve some technical problems related to beef production. Relationships between sensory evaluation of Japanese Black beef by distribution traders of meat and the beef physico-chemical characteristics were assessed. An optimal program was also developed to estimate the Beef Marbling Standard (BMS) number using dynamic ultrasound images. Furthermore, the evaluation of BMS with number estimation technology using biopsy or bioelectrical impedance analysis (BIA) was studied.</p> <ol style="list-style-type: none">1. Results obtained from meat quality evaluation suggest that evaluation based on physico-chemical characteristics, rather than evaluation of meat appearance, might better indicate sensory characteristics. Nevertheless, it was impossible to identify some primary physico-chemical characteristics related to sensory evaluation in beef samples with little difference in the meat quality grade.2. When learning data in each BMS group were equal and five estimated values were averaged, and the unit numbers of the hidden layers in a neural network were 15 to estimate the BMS number using dynamic ultrasound images of live fattening cattle objectively, a significant simple regression result was obtained between the estimated and observed BMS numbers. Results suggest that this program can estimate BMS more accurately, enabling proper estimation of BMS objectively and automatically by setting parameters such as learning data, number of estimations, and the unit number of hidden layers in a neural network.3. Relationships between moisture or crude fat contents of biopsy materials taken from <i>M. longissimus</i> of the last rib (sirloin) in live fattening cattle and the crude fat or BMS of the muscle of the 6th–7th rib (rib roast) were investigated. A significant correlation was found respectively between moisture and the crude fat contents of biopsy materials and crude fat or BMS of rib roast. Results show that moisture or the crude fat of biopsy materials of live animals within one month before slaughter can support the estimation of BMS.4. To investigate interrelationships between the BIA value, BMS, and the crude fat content of rib roast taken from sirloin of live fattening cattle within one month before slaughter, the intracellular resistance value (<i>R_{in}</i>) was calculated from the BIA value. A significant correlation was found respectively between <i>R_{in}</i>, BMS and the crude fat content of rib roast. Therefore, results suggest that BIA can help estimate BMS of live fattening cattle. <p>In conclusion, physico-chemical characteristics, rather than meat appearance, are more objective measures for sensory characteristics in meat quality evaluation. Furthermore, BMS estimation using dynamic ultrasound images, biopsy and BIA are applicable to early prediction of BMS in terms of the estimation accuracy. Especially, BIA is an extremely useful technique from the perspective of cost, operation, and convenience.</p>	