The Selection of Quality Indicator for Real Time Quality Prediction of Rice in Varying Temperatures and Modeling of Quality Deterioration

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In order to develop a real time quality prediction system for rice that is distributed in the varying temperatures, we stored rice in circumstances of fixed temperatures of 10°C, 20°C, 30°C, and 40°C and fluctuating temperatures of 10°C and 30°C for 2 weeks and 1 week in turn for three months and analyzed correlation between the quality properties and sensory characteristics and as a result, the fatty acidity and turbidity changes that had significant correlation in the every temperature condition was chosen as the quality indicator (R=0.90-0.95) for quality prediction used during rice distribution. Accordingly, we are developing a model with two criteria and get a result that the model expects the concentration of the reactants well comparing the expected fatty acidity($r^2=0.84$) and turbidity($r^2=0.92$) data from the model with modified Arrhenius equation with the actual measurement through fix temperature experiment. One of safe storage limits for rice, the fatty acidity is less than 20 mL KOH/100g dry matter and in the storage temperature of 10°C, it kept under safe storage limits until 15 weeks' storage but in the storage temperatures of 20°C, respectively. For the storage with fluctuating temperatures, it kept by 14 weeks but in the 15th week, it increased dramatically. The turbidity change tended to decrease in the whole temperatures in the early 34NTU and became to decrease faster if the storage temperature increased. It is thought that because the rice surface becomes more dried and more residue of rice bran and starch flour fall off.