

Moisture and Oil Contents Measurement of Red-pepper Powder Using 10MHz Pulsed NMR

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Nondestructive measurement of moisture content(MC) and oil content(OC) is crucial for on-line red-pepper powder processing. Using a 10MHz pulsed 1H NMR system(NMS110), free induction decay(FID) and spin-echo pulse techniques were used to measure moisture and oil contents of red-pepper powder nondestructively. Prediction models for MC and OC measurement were developed using FID and spin-echo signals. The model for MC measurement using an FID signal had SEC of 1.05% and SEP of 0.94%. The model for OC measurement using a spin echo signal had SEC of 0.60% and SEP of 0.53%. A model for simultaneous measurement for MC and OC was developed. To measure MC and OC simultaneously, both an FID signal and a spin-echo signal were used. After measuring MC, the spin-echo signal was divided by the FID signal. This ratio was used for measuring OC. The value of r^2 of validation for MC and OC measurement were 0.98 and 0.95 respectively and SEPs were 1.09% and 0.85%. The results demonstrated that the low resolution pulsed NMR system could be used for simultaneous nondestructive MC and OC measurements of red-pepper powder.