

Development of low-cost and convenient instrument for detection of ppb-level NO₂ during tobacco curing process

오인혁¹, 임광수¹, 조시형¹, 이영택¹, 지상운¹, Michael D. Boyette²
KT&G 중앙연구원 상품개발부¹, Dept. of Biological and
Agricultural Engineering, North Carolina State University²

Our instrument has been initially developed for monitoring the nitrogen oxide (NO_x) gas in indirect-fired tobacco curing barns. Recent research has shown that NO_x gases generated in direct-fired curing barns cause the formation of certain composition. A substantial reduction of NO_x level during tobacco curing process is necessary for reducing or eliminating the formation of that certain composition in tobacco leaves. The on-going periodic monitoring of NO_x levels during curing is considered essential in the maintenance of curing equipment. Therefore, it should be supported by development of NO_x detecting system, which can offer low-cost, compact, convenient and accurate method of measurement.

Through color change by nitrogen dioxide (NO₂) on ordinary filter papers impregnated with an organic compound, o-tolidine, it was found that we could detect NO₂ gas with our method. The calibration line between NO₂ levels and absorbance changes at peak wavelength showed good linear relationships which indicate the possibility of measuring ppb-level NO₂.

Finally, it was found that NO₂ gases with ppb-level were successfully measured through comparison between our developed method and the other reference method. Also, through its application to tobacco curing process, our developed instrument will be a good indicator for detecting leak of NO_x gas from the burner during tobacco curing process.