

Determination of Nitrite in Processed Meat Using Digital Image Method and Powdered Reagent

A B S T R A C T

A novel analytical approach for the rapid determination of nitrite in processed meat was developed. A yellow to reddish orange colored spots from chrysoline resorcinol azo dye created and photographed using the digital image based (DIB) method. The spots resulted from the reaction of nitrite with a powdered reagent consists of a ground solid mixture of sulfanilic acid and resorcinol. Quantification of nitrite was obtained using ImageJ software containing RGB color model. The limit of detection (LOD), quantification (LOQ) and the linear analytical range were 0.5, 1.7 mg L⁻¹ and 2.0-60 mg L⁻¹ (R=0.990), respectively. Also, using the dissolved spot (DS) method followed by a spectrophotometric measurement afforded a LOD, LOQ and linear analytical range of 0.04 and 1.3 mg L⁻¹ and 1.5-80 (R = 0.993), respectively. The developed methods were applied to the determination of nitrite residue in commercial chicken sausages, luncheon meat, luncheon chicken, and luncheon turkey and beef samples with satisfied accuracy. The results obtained by the DIB and DS methods were compared to the official AOAC 973.31 method and showed no significant differences. The corresponding Pearson correlation coefficients (R²) for spiked beef extract are 0.994 and 0.997, respectively.