

Determination of lard in mixture of body fats of mutton and cow by Fourier transform infrared spectroscopy

ABSTRACT

Fourier transform infrared (FTIR) spectroscopy provides a simple and rapid means of monitoring lard when blended with mutton and cow body fats. The spectral bands associated with mutton, cow body fats and their lard blends were recorded, interpreted and identified by relating them to those spectroscopically representative pure mutton, cow and lard body fats as references. A qualitative approach is proposed by comparing the pure animal fat with blended ones. Partial least squares (PLS) regression was applied for quantitative determination of the percent of lard in its blend with mutton body fat (MBF) using FTIR spectral data at frequency regions 3010 - 3000, 1220 - 1095 and 968 - 965 cm^{-1} . The equation $y = 1.151x - 0.1882$, coefficient of determination (R^2) = 0.9866 with standard error (SE) of 2.01. For the blend with cow body fat (CBF) frequency regions 1419 - 1414 and 968 - 965 cm^{-1} were used for qualitative and quantitative determination. PLS approach was used to create the equation $y = 0.7239x + 3.1369$ with $R^2 = 0.9749$ and $SE = 1.86$. The PLS calibration models were cross-validated and the standard deviation of difference (SDD) for repeatability and accuracy and R^2 were computed.

Keyword: CBF; FTIR spectroscopy; Lard; MBF; PLS