

- Title:** Use of fourier transform infrared spectroscopy in combination with partial least square for authentication of black seed oil
- Author/Authors:** Abdul Rohman, Desti Wibowo, Sudjadi, Endang Lukitaningsih, Arieff Salleh Rosman
- Abstract:** Fourier transform infrared spectroscopy in combination with multivariate calibration of partial least square is intended for quantitative analysis of black seed oil in binary mixture with sunflower oil and walnut oil, as well as in ternary mixture with sunflower oil and walnut oil. The spectra of black seed oil, sunflower oil, walnut oil, and their mixture with certain concentration were scanned using attenuated total reflectance at mid infrared region of 4000-650 cm^{-1} . For quantitative analysis, Fourier transform infrared spectral treatment (normal or derivatives) with the highest values of coefficient of determination (R^2) and the lowest values of root mean square error of calibration was selected as optimal calibration model. Partial least square at whole mid infrared region of 4000-650 cm^{-1} is well suited for quantitative analysis of black seed oil either in binary mixture or ternary mixture with walnut oil and sunflower oil. Furthermore, using absorbancies at frequency region of 3009-721 cm^{-1} , principal component analysis is successfully used for classification of black seed oil and that mixed with sunflower oil and walnut oil. The developed method is rapid, no sample preparation needed, and is not involving the use of chemical reagents and solvents.