

Title The effects of freeze-drying and storage on the FT-Raman spectra of Atlantic mackerel (*Scomber scombrus*) and horse mackerel (*Trachurus trachurus*)

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Citation Food Chemistry, Volume 103, Issue 1, 2007, Pages 62-70

Keywords Atlantic mackerel; Horse mackerel; Freeze-drying; Lipids; Proteins; FT-Raman spectroscopy

Abstract

FT-Raman spectroscopy was undertaken for quantitative characterization of lipids in horse mackerel (*Trachurus Trachurus*) and Atlantic mackerel (*Scomber scombrus*). Peroxide value of fish lipids and protein extractability of the fish lipids and muscles were also measured by titration and Bradford assay, respectively.

Raman spectral analysis of oil extracted from freeze-dried Atlantic and stored (12 weeks) mackerel and horse mackerel revealed significant reductions in the intensity of bands associated with CH₂ stretches and C=O ester stretches. This was also confirmed by an increase in the intensity of the bands at 3011 cm⁻¹ and 2960–2850 cm⁻¹, suggesting alterations in lipid structure involving CH groups. An initial rise followed by a decline in peroxide value of the oil extracted from freeze-dried mackerel and horse mackerel stored at 22 °C for 12 weeks confirmed the occurrence of lipid oxidation. Structural changes in the proteins of freeze-dried mackerel and freeze-dried horse mackerel stored for 12 weeks at 22 °C resulted in a decrease in the solubility of myofibrillar proteins in salt solution.