Supplementary data

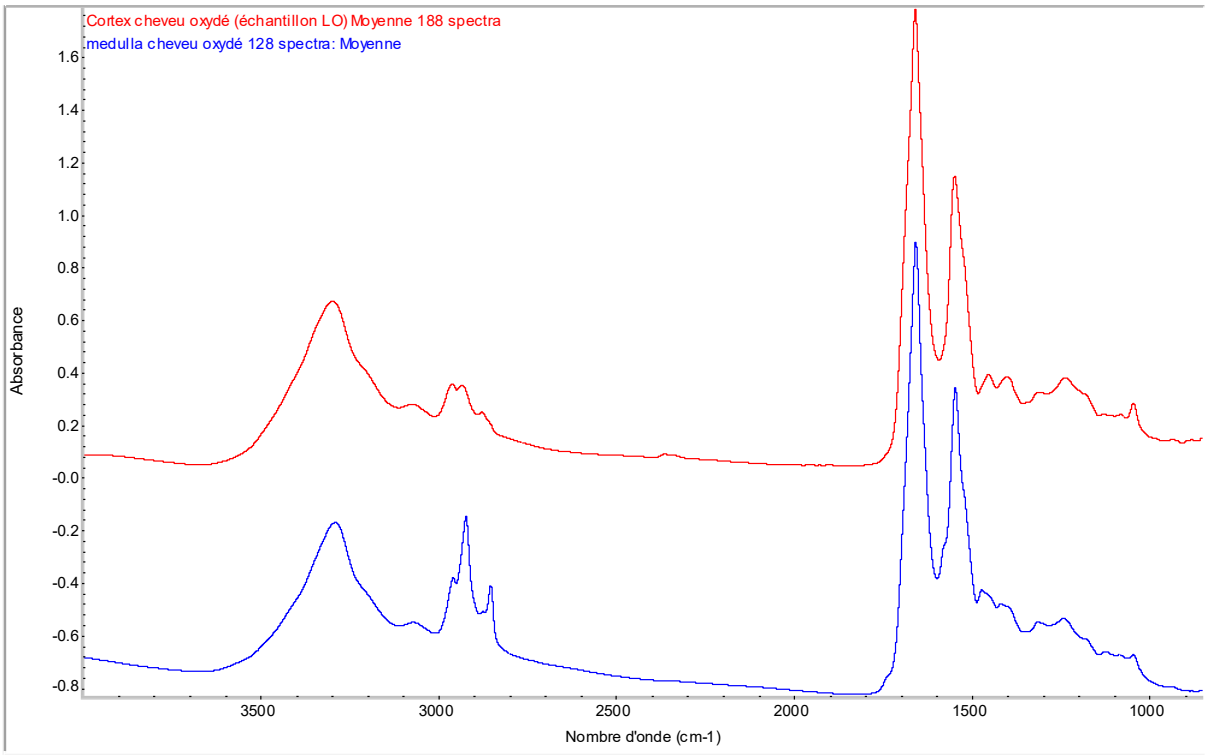

Figure S1. Typical SR-µFTIR spectra of hairs. Average spectra from Sample 1. Cortex (red), medulla (blue). Spectra were shifted for clarity. The spectra are dominated by the amide I and amide II bands from proteins in the 1500-1700 cm^{-1} and 3000-3500 cm^{-1} ranges. Lipid C–H peaks can be seen in the medulla spectrum between 2800 and 3000 cm^{-1}. Spectra were offset for clarity.

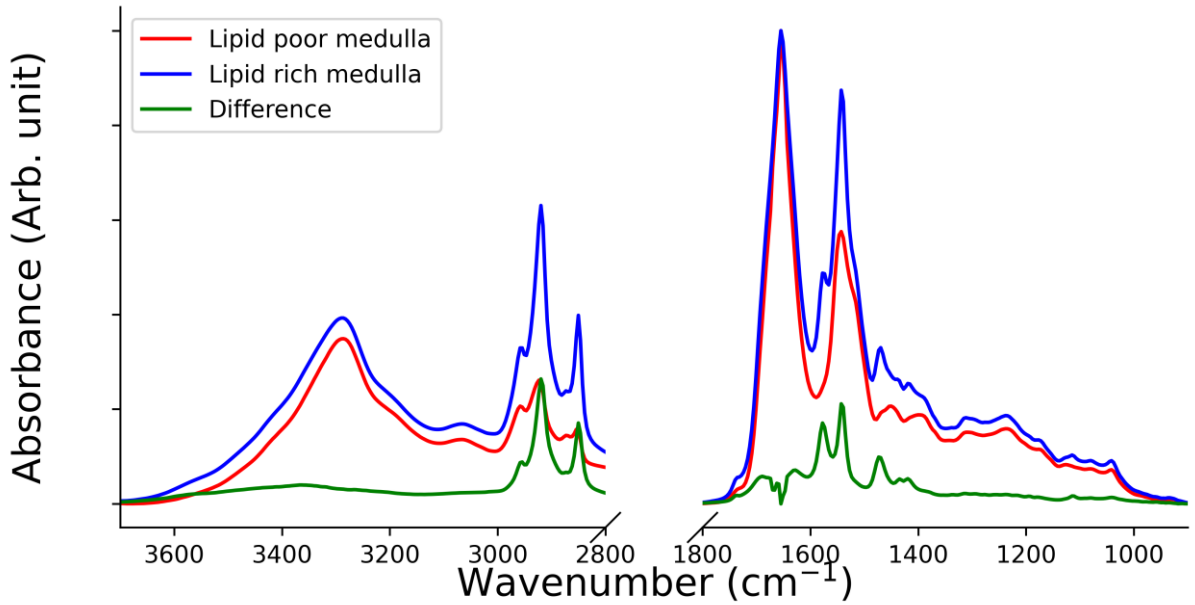

Figure S2. Lipid contribution in the IR spectrum of hair medulla. Blue: average of 15 calcium carboxylate rich medulla spectra, red: spectrum of lipid poor medullas, green: spectrum of lipids and calcium soaps of fatty acids in the medullas obtained by difference spectroscopy. Aliphatic lipids exhibit peaks at 2930, 2915, and 2850 cm^{-1}. Calcium soaps of fatty acids have major peaks at 1575, 1541, 1470 cm^{-1}, and minor peaks at 3550, 3350, 1620, 1430, 1420, 1113 cm^{-1}.

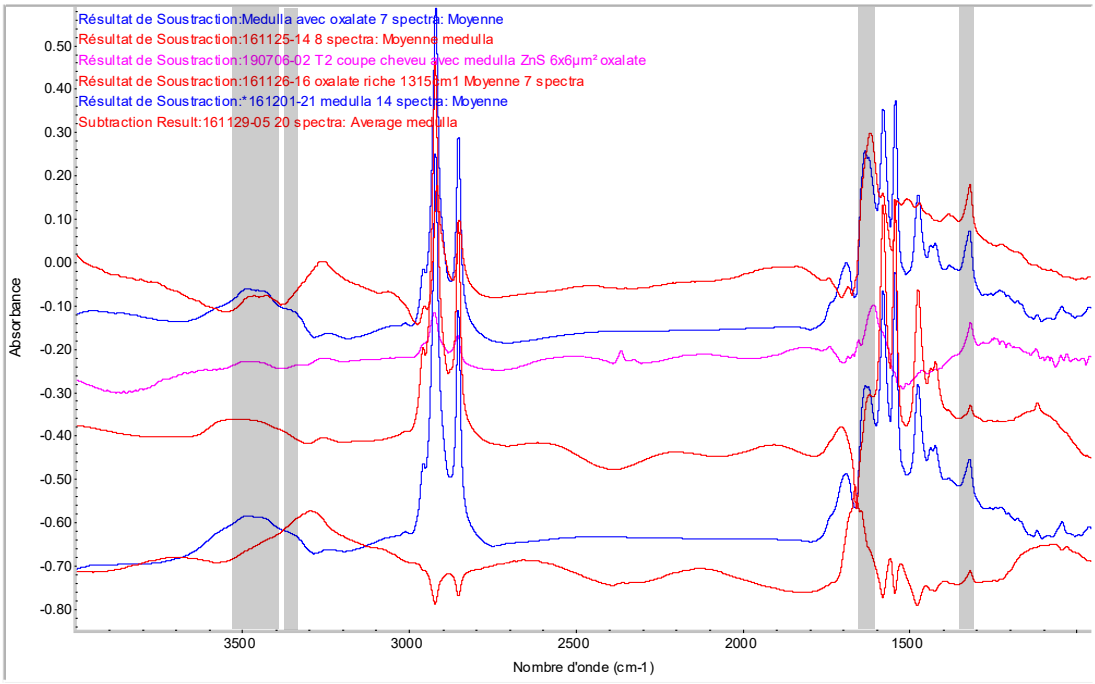

Figure S3. Detection of calcium oxalate in the hair medulla from Sample 1 by SR-µFTIR. Difference spectra showing clear calcium oxalate signal in 6 different medullas from Sample 1. The characteristic calcium oxalate peaks are underlined in grey. The spectra were offset for clarity.

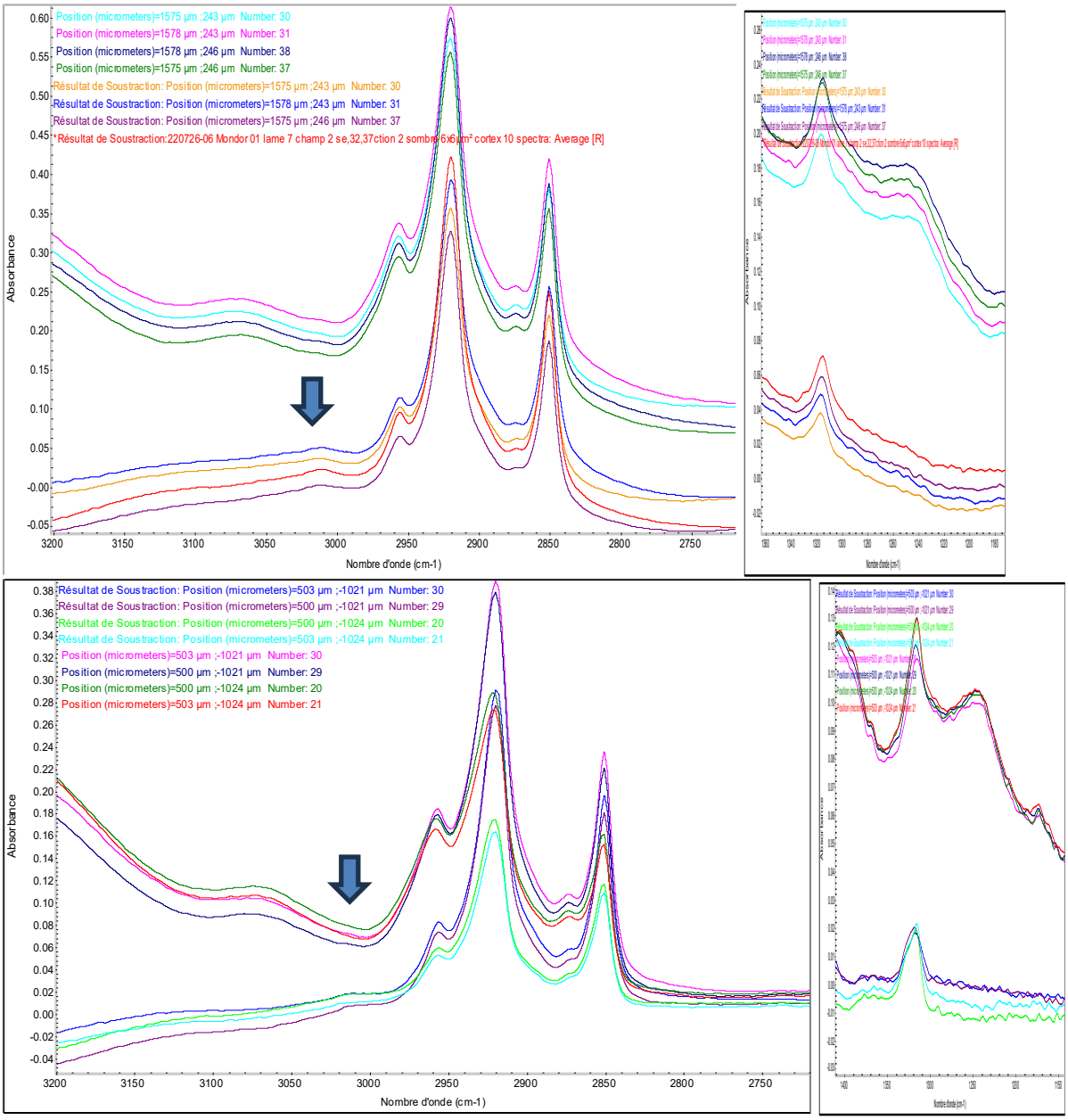

Figure S4. Unsaturations in medullas containing oxalate. Top, raw spectra, bottom subtracted spectra. Left panel: CH stretching range. Right panel: calcium oxalate peak. Spectra were offset for clarity.

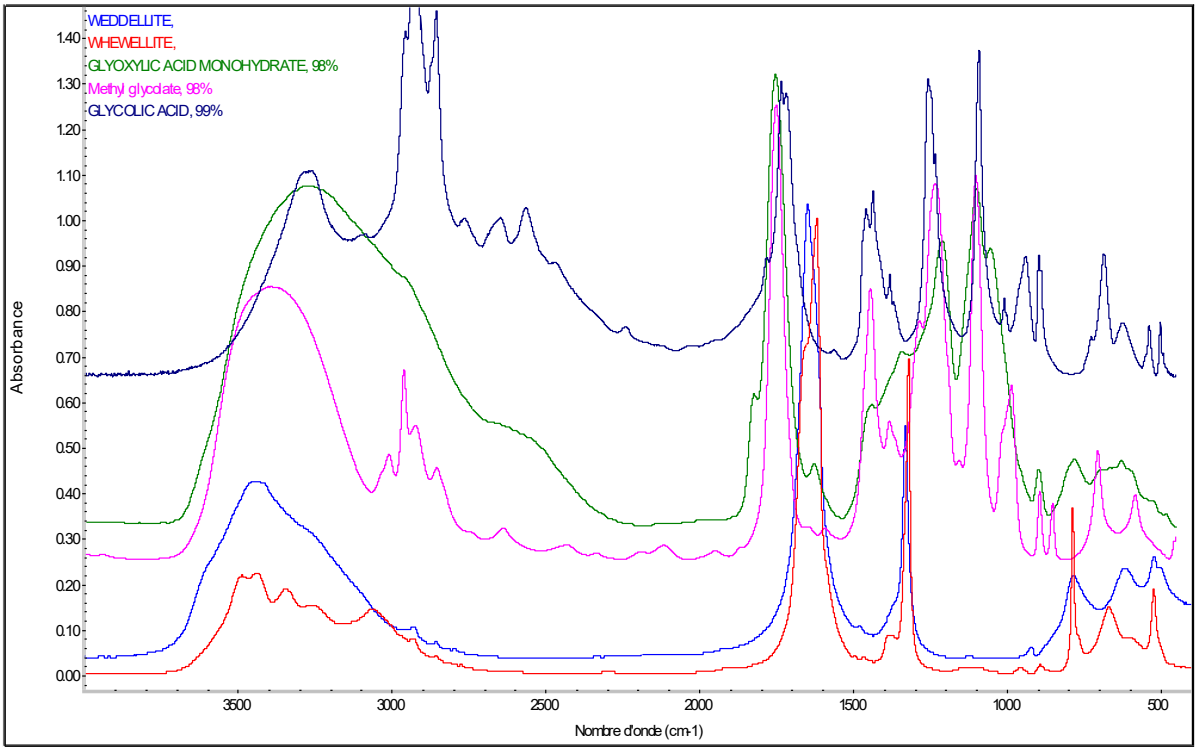

Figure S5. Comparison of calcium oxalates (COM & COD), glyoxylic acid, glycolic acid, and methyl glycolate IR spectra. COM and COD spectra are easily recognizable from those of glyoxylic acid, glycolic acid, and methyl glycolate. Weddellite and whewellite spectra are from The Kidney – basic spectral library. The other spectra from the HR-Aldrich FT-IR Collection Edition II spectral library. Spectra were offset for clarity.