

SUPPORTING INFORMATION FOR:

**INSIGHTS INTO THE SORPTION PROPERTIES OF CUTIN AND
CUTAN BIOPOLYMERS**

*Michal Shechter and Benny Chefetz**

Department of Soil and Water Sciences, The Hebrew University of Jerusalem, P.O. Box 12,
Rehovot 76100, Israel

*Corresponding author—Tel: +972 (8) 948-9384; Fax: +972 (8) 947-5181;

Email: chefetz@agri.huji.ac.il

For submission to Environmental Science and Technology

Supporting Information.

Pages: 4

Figures: 1

FTIR analysis

Fourier transform infrared (FTIR) absorption spectra of the cutin and cutan samples were obtained for a wave number range of 4000 to 400 cm^{-1} on a Nicolet 550 Magna-IRTM spectrometer (Nicolet Instruments, Madison, WI, USA). The samples for the analysis were prepared according to the method reported by Chefetz (*1*). In briefly, samples were oven-dried at 65°C for 48 h prior to analysis. Finely ground samples (2 mg) were mixed with 98 mg of KBr and compressed into pellets. To obtain FTIR spectra, 40 scans were collected; a linear baseline correction was applied using 4,000, 2,000, and 860 cm^{-1} as zero absorbance points. FTIR spectra of the biopolymers are presented in Figure S1.

Both spectra are dominated by aliphatic CH_2 and CH_3 asymmetric and symmetric stretching bands at 2930, 2925, 2850, 1465 and 726 cm^{-1} . However these paraffinic moieties are more pronounced (as compared to the $\text{C}=\text{O}$ moieties at 1730 and 1717 cm^{-1}) in the cutan spectrum than in the cutin sample. The paraffinic moieties were suggested as a major sorption domain for hydrophobic compounds (*1*). The cutin sample is dominated by a peak at 1730 cm^{-1} with a shoulder at 1717 cm^{-1} , assigned to $\text{C}=\text{O}$ stretching vibrations of ester groups. The shoulder at 1717 cm^{-1} indicates that some of these functional groups are involved in hydrogen bonding (*2*). The bands at 1340-1380, 1373 and 1170 cm^{-1} are assigned to C-O-C stretching vibrations of the ester groups. These moieties are well pronounced in the cutin spectrum. Both spectra are characterized with minor bands at 1285, 1256, 1128, 1110, 1075, 1005 and 995 cm^{-1} which are assigned to C-O stretching of polysaccharides. The bands at 1660, 1636, 1626, 1620, 1608, 1518 and 1422 cm^{-1} are assigned to $\text{C}=\text{C}$ stretching vibration in the aromatic ring. A shoulder at 1450 cm^{-1} (C-C stretching vibration in the aromatic ring) only appears when the aromatic ring is conjugated with unsaturated groups (e.g., $-\text{COOH}$), suggesting that phenolic acids or analogous compounds are present in the matrix in the cutin sample (*1*). Two distinct

bands at 835 and 532 cm^{-1} correspond to C-H and C-C out-of-plane bending vibrations in the aromatic ring.

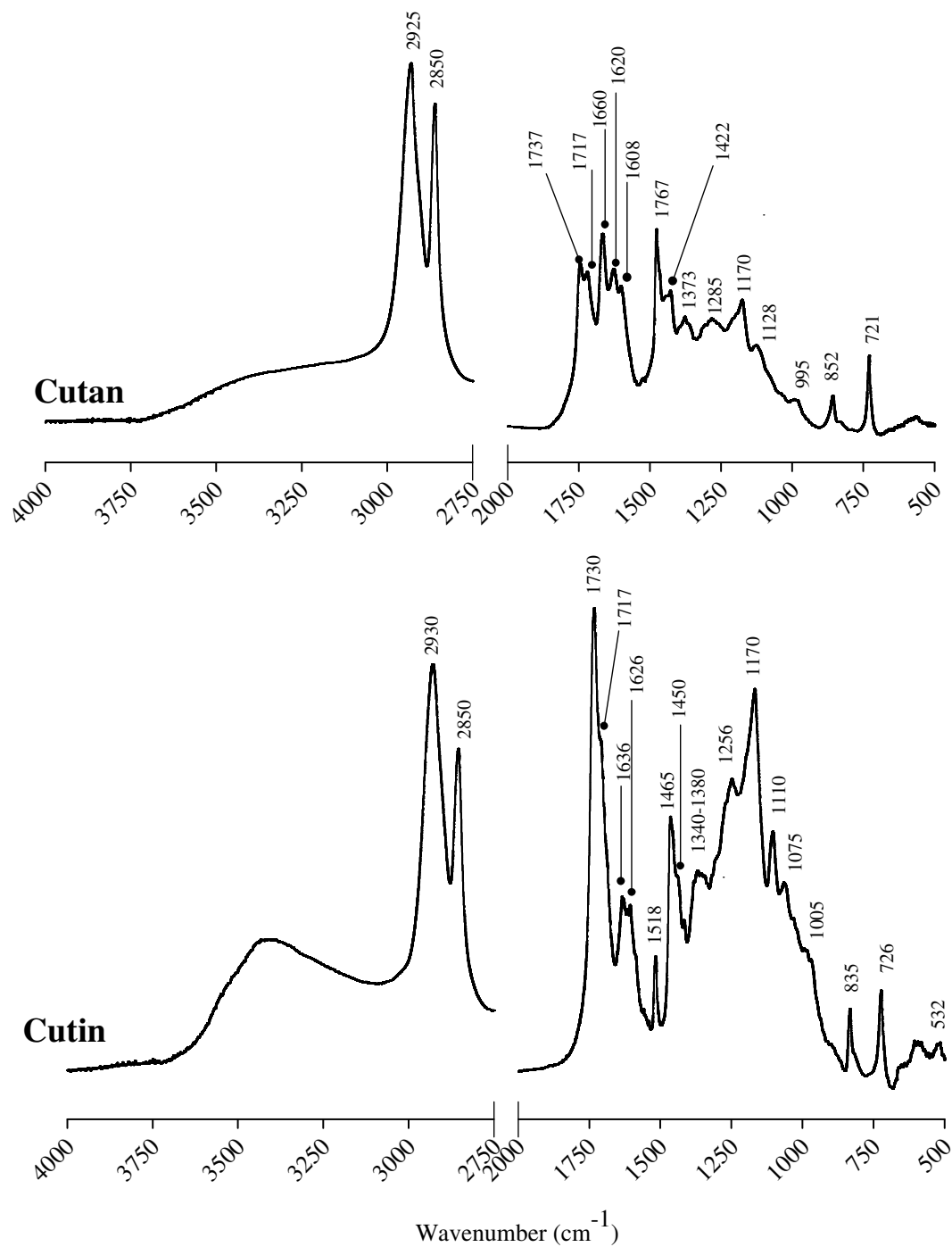


Figure S1. FTIR spectra of the cutin (bottom) and cutan (top) biopolymers.

Literature cited

- (1) Chefetz, B. Sorption of phenanthrene and atrazine by plant cuticular fractions. *Environ. Toxicol. Chem.* **2003**, 22 (10), 2492-2498.
- (2) Chen, B.; Johnson, E. J.; Chefetz, B.; Zhu, L.; Xing, B. Sorption of polar and nonpolar aromatic organic contaminants by plant cuticular materials: role of polarity and accessibility. *Environ. Sci. Technol.* **2005**, 39 (16), 6138-6146.