Time domain terahertz optoacoustics: manipulable water sensing and dampening

Jiao Li,† Yixin Yao,† Liwen Jiang,† Shuai Li, Zhihao Yi, Xieyu Chen, Zhen Tian,* and Weili Zhang*

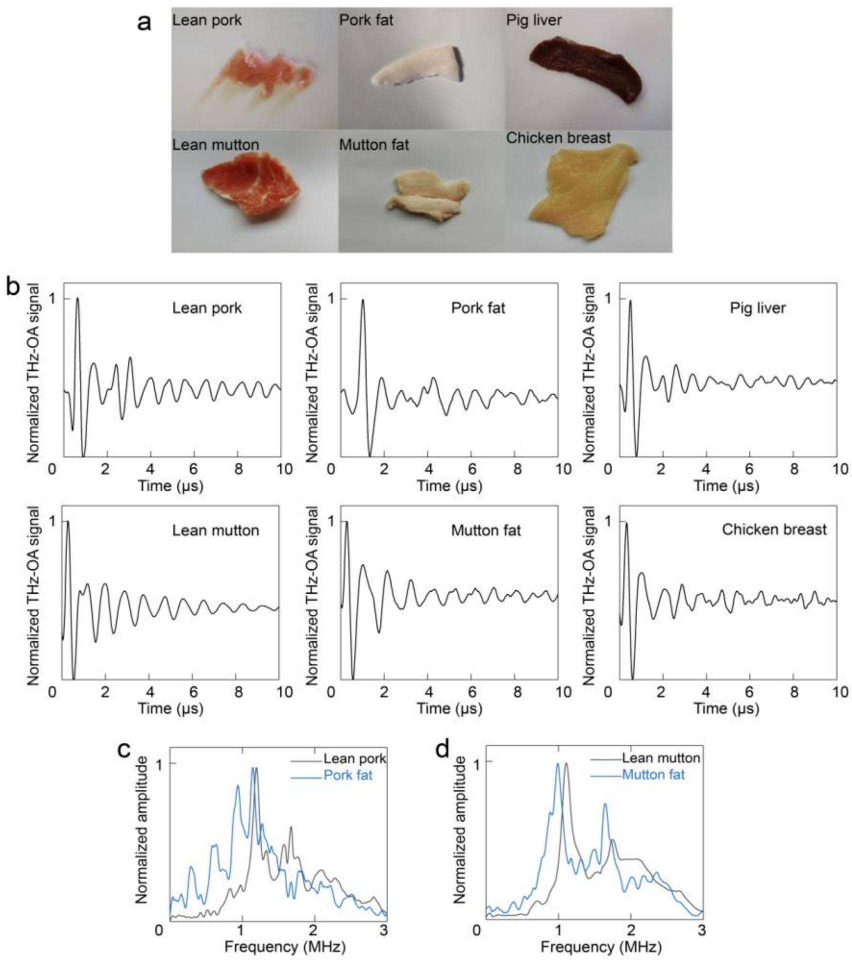

Figure S1. Terahertz optoacoustic response from various fresh meat samples. **(a)** Photographs of the tissues analyzed. **(b)** Time-domain terahertz optoacoustic signals from the tissues. **(c)** Transformation of the signals in panel (b) to the frequency domain.

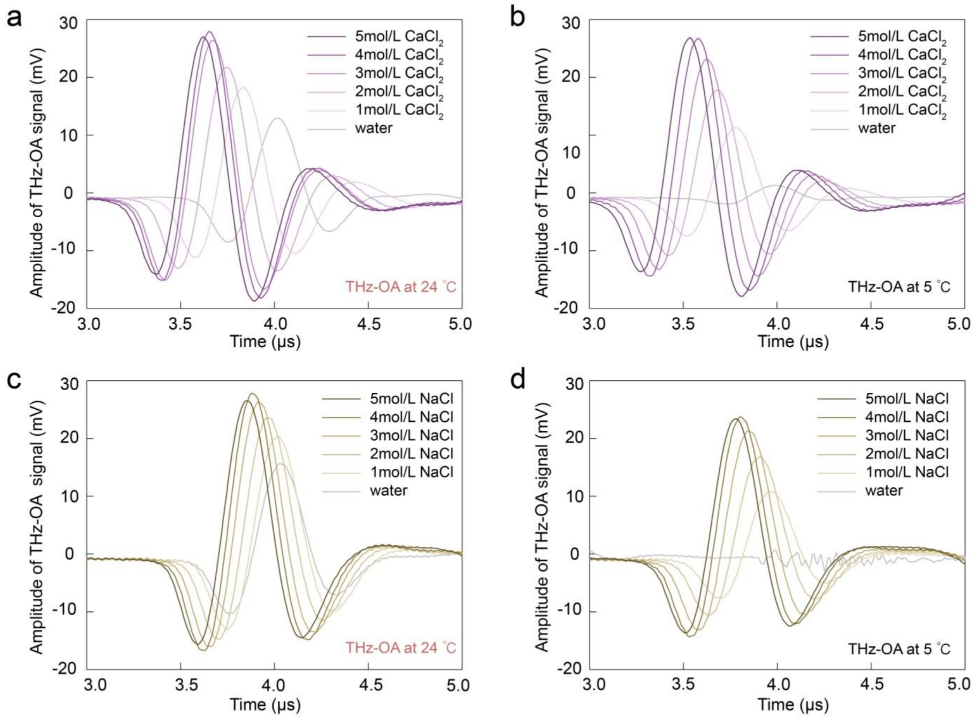

Figure S2. Concentration dependence of the time-domain terahertz optoacoustic signal of $CaCl_2$ and NaCl solutions with high concentrations at 24 °C and 5 °C. **(a)** Terahertz optoacoustic (THz-OA) signals of pure water and increasingly concentrated $CaCl_2$ solutions at 24 °C. **(b)** The same measurements were performed as in panel (a) but at 5 °C. **(c)** THz-OA signals of pure water and increasingly concentrated NaCl solutions at 24 °C. **(d)** The same measurements were performed as in panel (c) but at 5 °C.

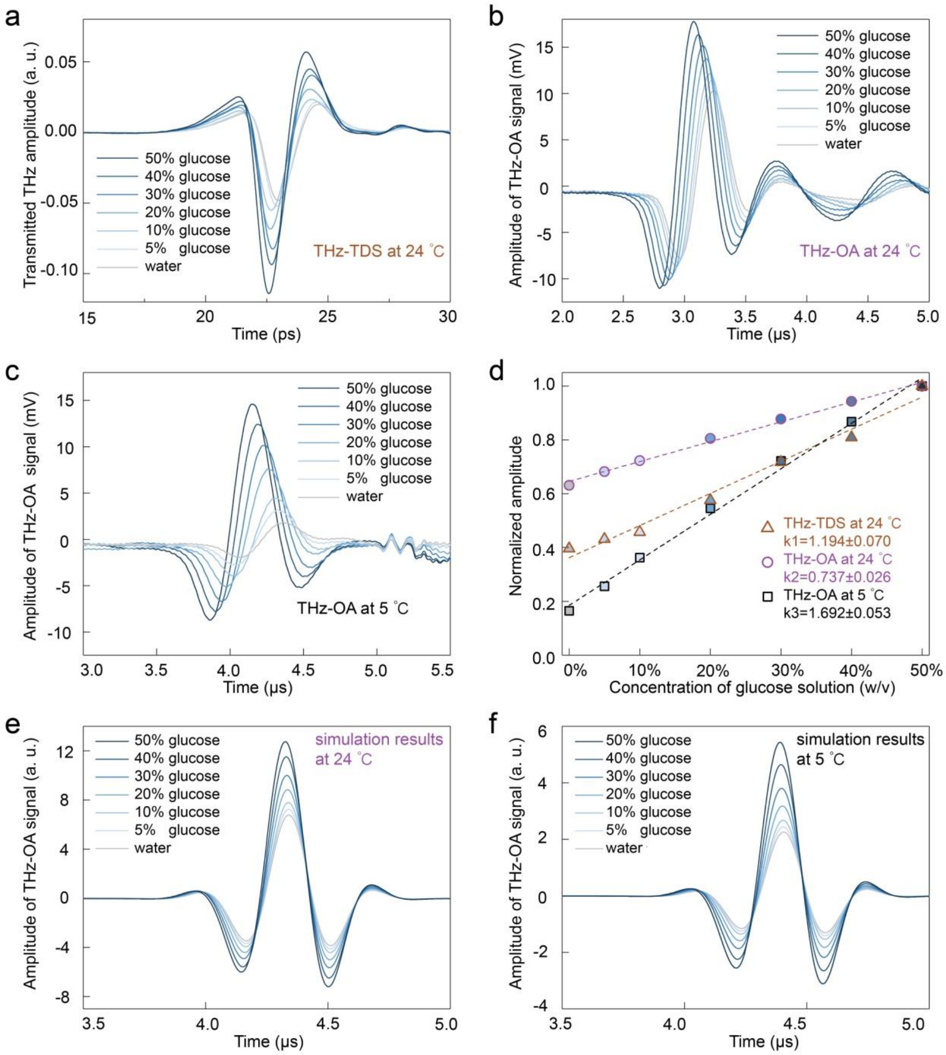

Figure S3. Comparison of experimental and simulated optoacoustic signals of glucose solutions at 24 °C or 5 °C. **(a)** Terahertz time-domain spectroscopy (TDS) of pure water and increasingly concentrated glucose solutions. Measurements were taken at 24 °C. **(b)** Terahertz optoacoustic (THz-OA) response of pure water and increasingly concentrated glucose solutions at 24 °C. **(c)** The same measurements were performed as in panel (b) but at 5 °C. **(d)** Normalized amplitudes obtained for different glucose concentrations in aqueous solution using our THz-OA setup at 24 °C (purple), our THz-OA setup at 5 °C (black), and a commercially available TDS (brown). **(e)** Simulated optoacoustic signals of pure water and increasingly concentrated glucose solutions at 24 °C. **(f)** The same simulations were performed as in panel (e) but at 5 °C. Simulations were performed as described in Methods.

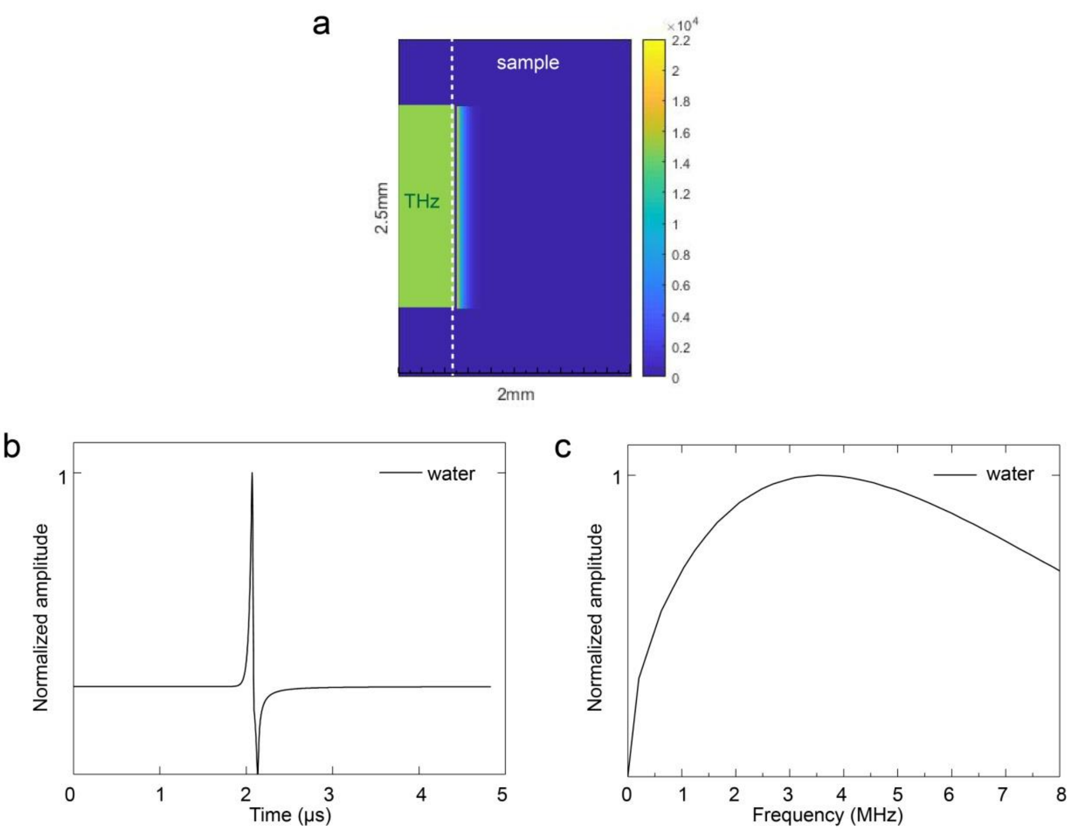

Figure S4. Simulated terahertz optoacoustic (THz-OA) signals of water. (a) Distribution of terahertz intensity in water; (b) Time-domain THz-OA signals detected by the simulated detector and (c) its frequency transformation.