

Action of lytic polysaccharide monooxygenase on plant tissue is governed by cellular type

Brigitte Chabbert^{1*}, Anouck Habrant¹, Mickaël Herbaut¹, Laurence Foulon¹, Véronique Aguié-Béghin¹, Sona Garajova², Sacha Grisel², Chloé Bennati-Granier², Isabelle Gimbert-Herpoël², Frédéric Jamme³, Matthieu Réfrégiers³, Christophe Sandt³, Jean-Guy Berrin² and Gabriel Paës¹

¹ FARE Laboratory, INRA, University of Reims Champagne-Ardenne, 51100 Reims, France

² BBF, INRA, Aix Marseille University, Polytech'Marseille, 13288 Marseille, France

³ Synchrotron SOLEIL, 91190 Saint Aubin, France

Figure S1: Effect of *Pa*LPMO9E on enzymatic hydrolysis of steam exploded miscanthus. (a) SEM imaging shows detructuration of steam exploded miscanthus (scale bar=300 μ m); (b) *Pa*LPMO9E improved enzymatic degradation of miscanthus by Celluclast® ; (c) *Pa*LPMO9E oxidation of steam exploded miscanthus releases C1-oxidized sugars as dimer (DP2C1-ox), trimer (DP3C1-ox), and tetramer (DP4C1-ox).

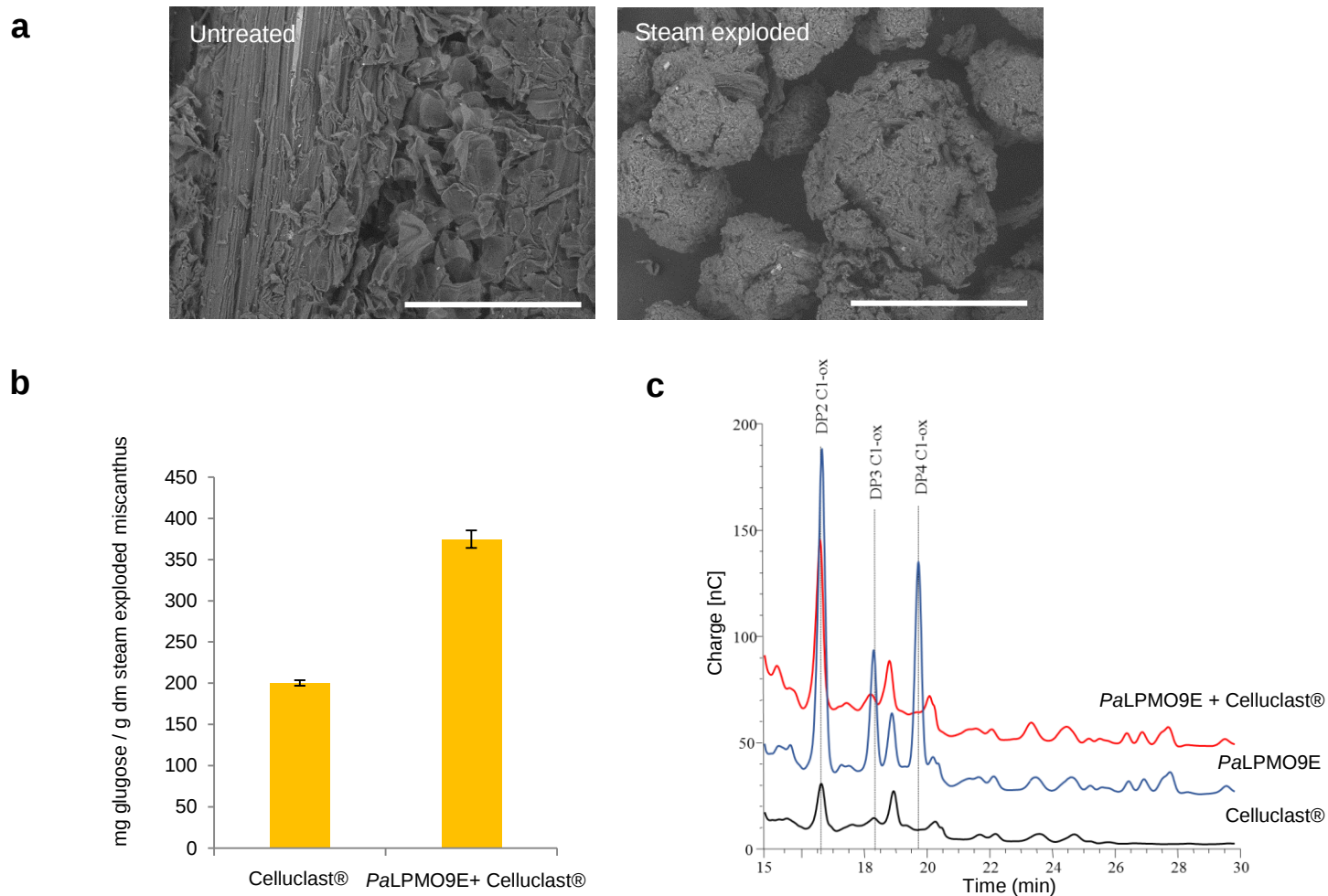


Figure S2: Chemical composition of untreated and chlorite-treated miscanthus. Lignin content is decreased by 5-fold, while relative content in arabinoxylan and cellulose increase.

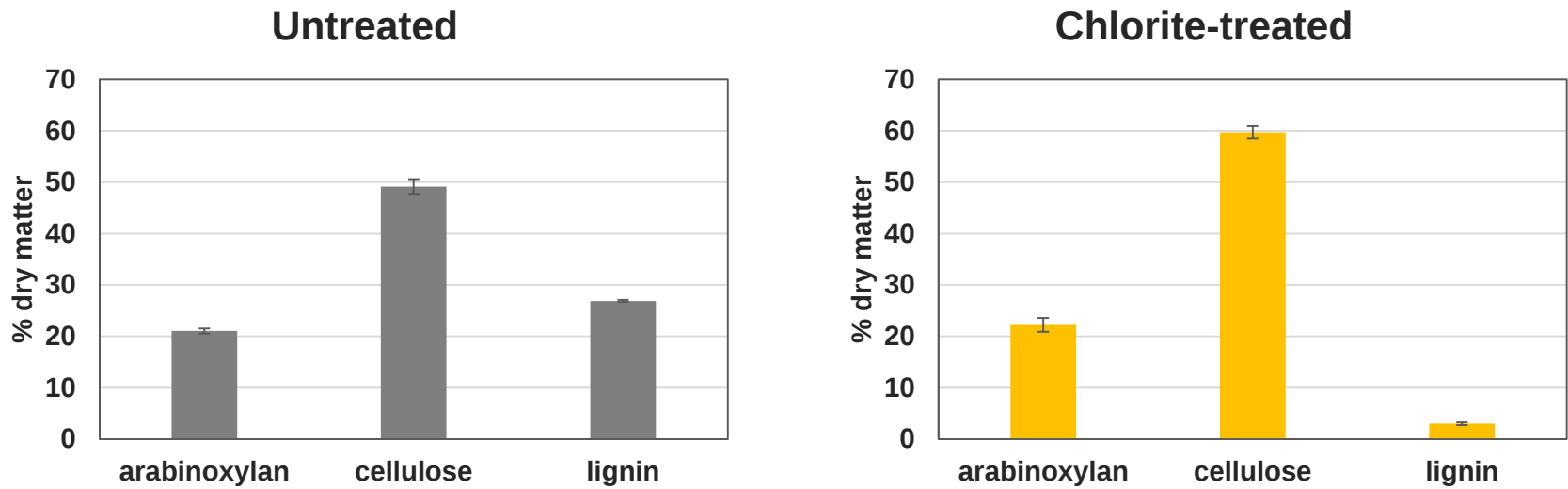


Figure S3: Time-lapse imaging of chlorite-treated miscanthus sample. Structure and fluorescence of region 1 are not modified over a time-period of more than 2 hours when incubated with *Pa*LPMO9E + Celluclast®. Scale bar = 200 μ m.

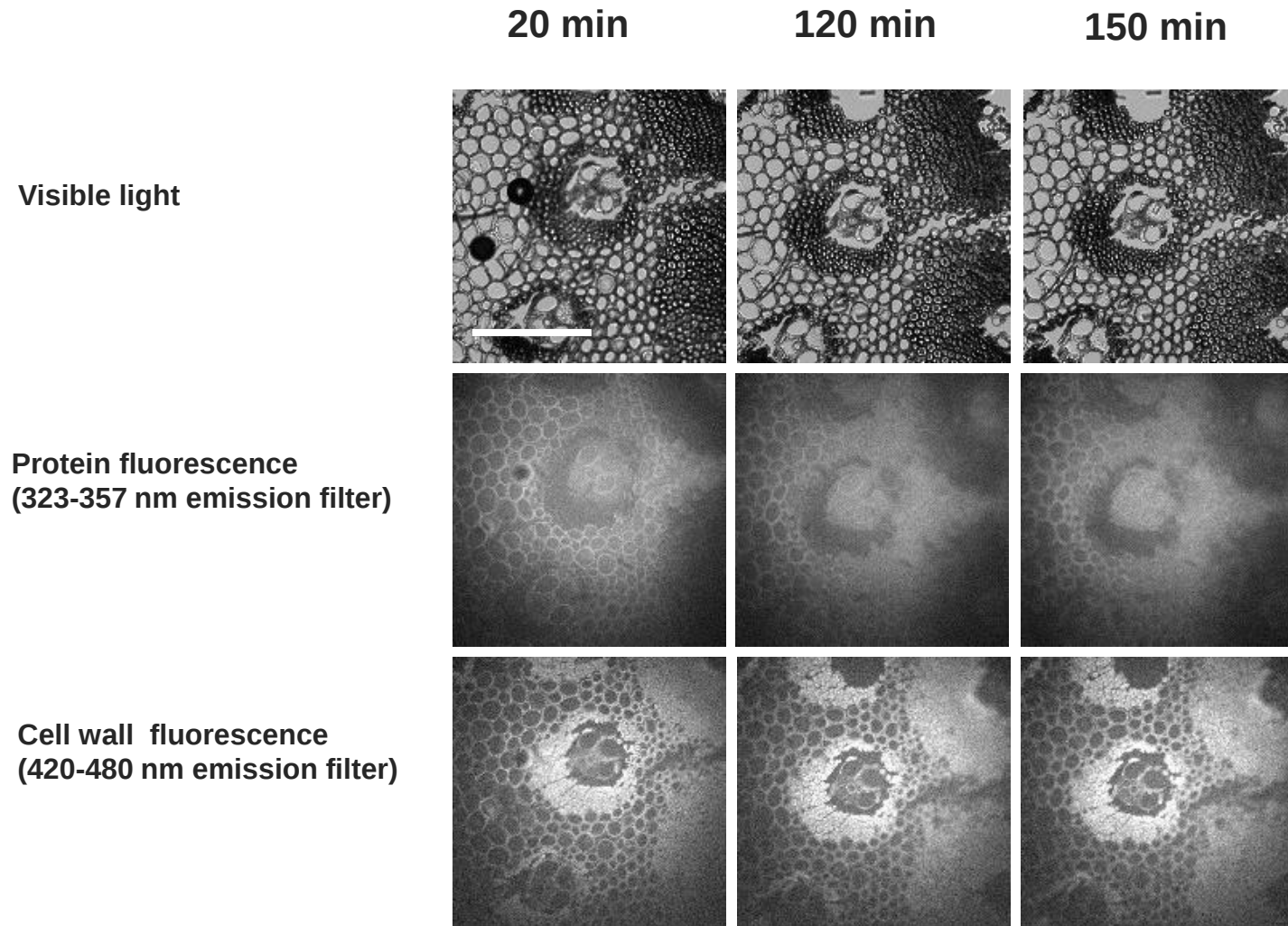


Figure S4: Time-lapse imaging of untreated miscanthus sample. Cell wall structure and fluorescence of region 2 are not modified over a time-period of more than 6 hours when incubated in the acetate buffer pH 4.5 at 45°C. Scale bar = 200 μ m.

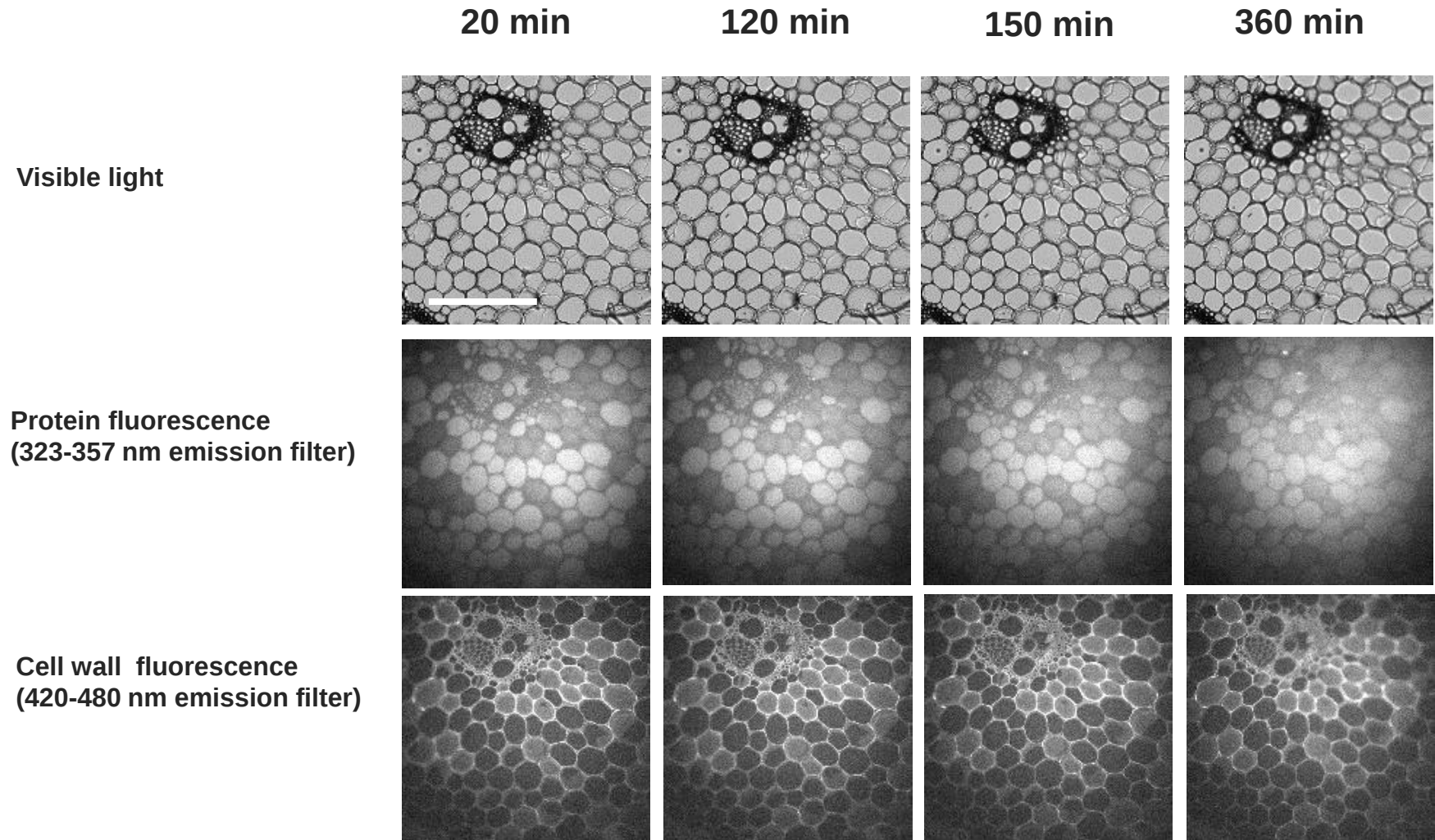


Figure S5: Time-lapse imaging of chlorite-treated miscanthus sample. Cell wall structure and fluorescence of region 2 are not modified over a time-period of more than 4 hours when incubated in the acetate buffer pH 4.5 at 45°C. Scale bar = 200 μ m.

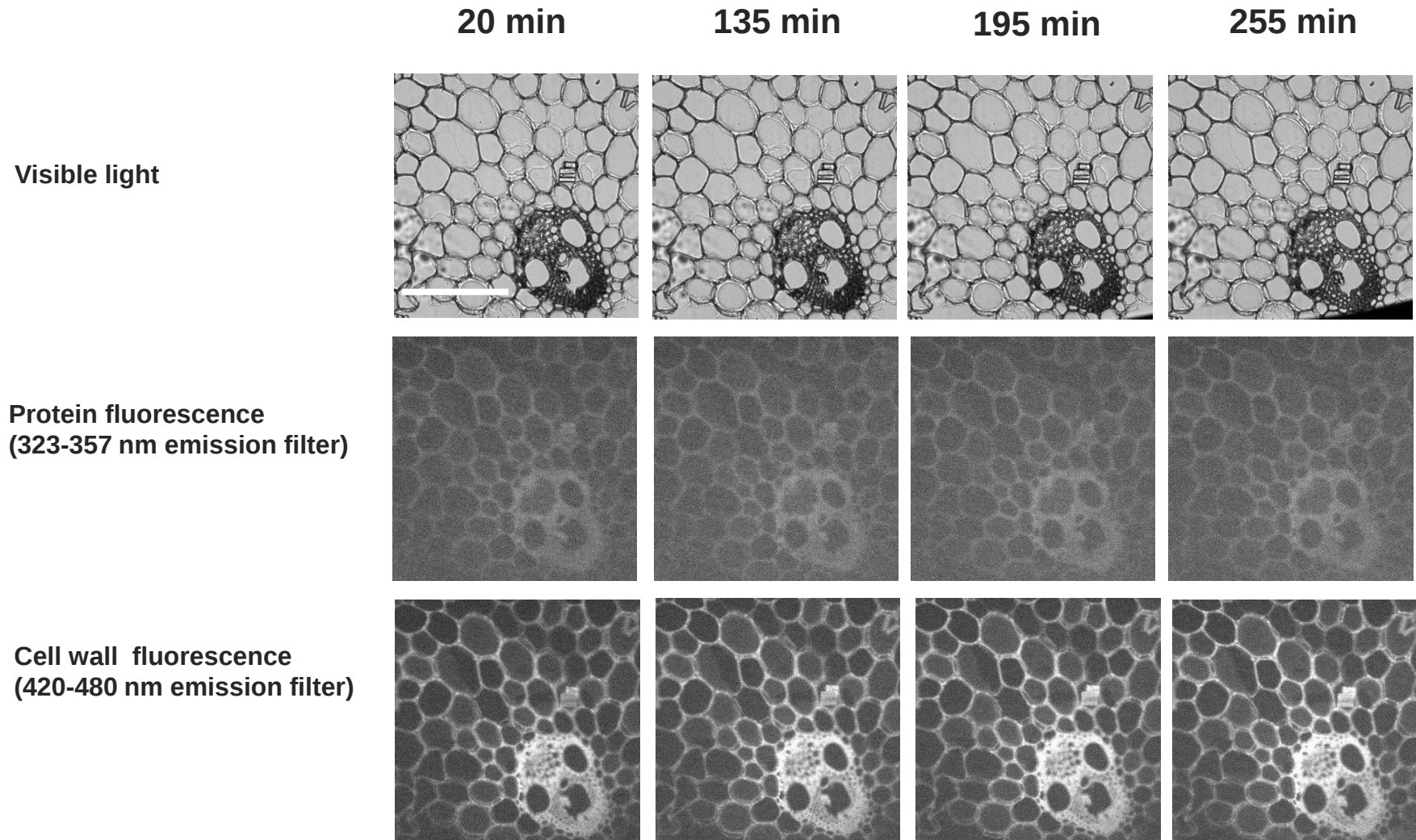


Figure S6: FTIR spectra of vascular bundle cells of untreated (a) and chlorite-treated (b) miscanthus after 20 min and 120 min incubation in buffer. Arrows indicate lignin band (1506 cm^{-1} and 1460 cm^{-1})

