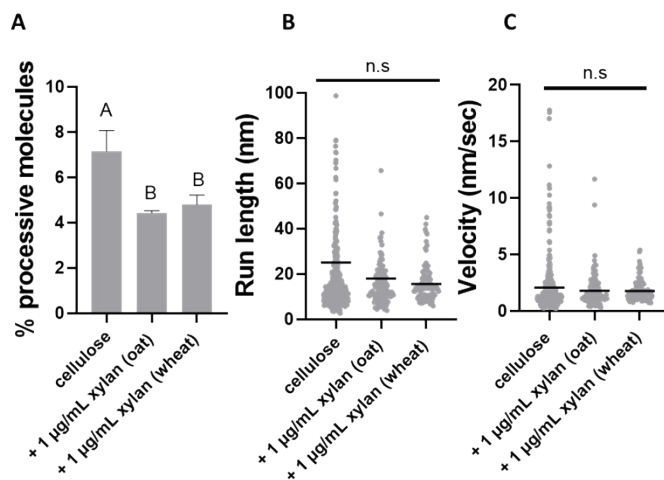


1 Supplementary

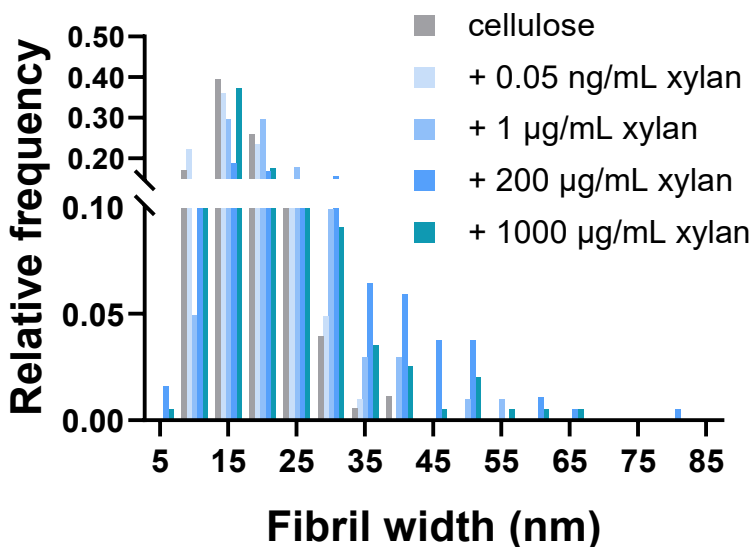


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3 **Figure S1.** Single molecule dynamics of Cel7A on bacterial cellulose composites
4 synthesized with 1 µg/mL purified oat xylan and wheat arabinoxylan. A, a reduction in
5 percentage of processive molecules was similar to that found in beechwood xylan
6 containing composites. B, some nonsignificant reduction in run length was observed
7 in the composites as compared to the cellulose control. C, as with beechwood xylan,
8 no significant differences were found in the velocities. Different letters indicate
9 statistical difference ($p < 0.05$).

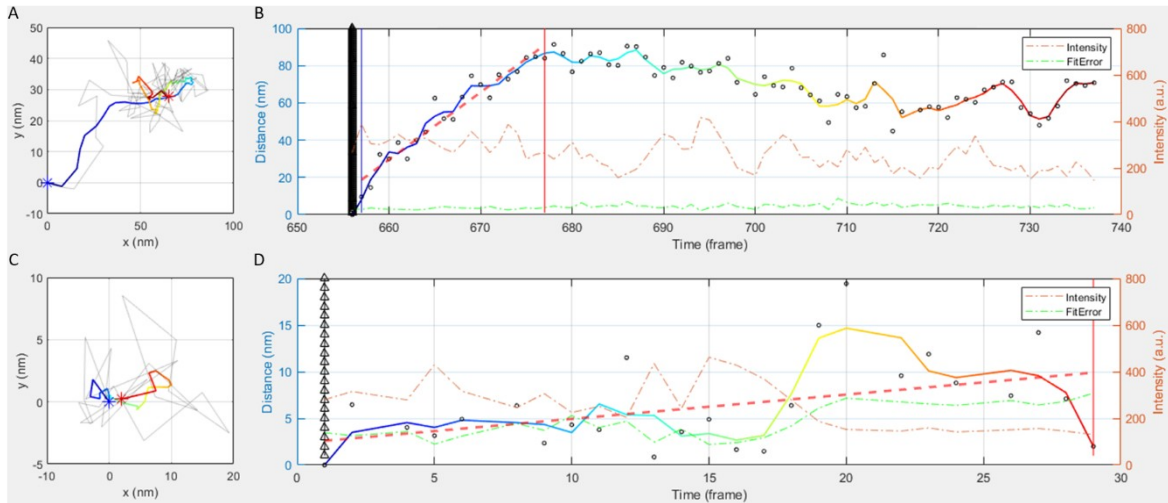
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13 **Figure S2.** The distribution of fibril width of cellulose and all xylan-containing
14 composites measured from SEM micrographs. This histogram was used to generate
15 the fit curves shown in figure 4H.



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Figure S3. An example for defining a processive segment during single-molecule analysis. A, a X-Y displacement plot of a processive particle. The time course is color coded with blue for the start of the trace and red for its end. B, the trace of the same particle seen in panel A plotted as distance X time with time course similarly coded. A linear segment in is delineated at the beginning and its end by a blue and a red vertical line, respectively. A dashed red line shows the fit for the linear segment and is used to calculated its speed and run length. C and D, X-Y plot and distance X time plot, respectively, of a static particle.

	cellulose	xylan concentration ($\mu\text{g/ml}$)			
		0.05	1	200	1000
particle # / area	125.9 \pm 35.9	82 \pm 25	65.7 \pm 20.5	44 \pm 12.3	52.4 \pm 8.7
processive particles (%)	6.9 \pm 0.5	7.5 \pm 1.5	2.5 \pm 0.8	2.8 \pm 1.1	3.1 \pm 1.2
velocity (nm/s)	2.3 \pm 2.4	3 \pm 3.5	2.2 \pm 2.6	2.3 \pm 2	2.2 \pm 2.3
run length (nm)	38.4 \pm 42.5	38.2 \pm 28.9	35.3 \pm 31.5	36.7 \pm 27.6	36.3 \pm 31.3

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Table S1. Means (bold) and standard deviations of single-molecule motility parameters presented in Fig 2.