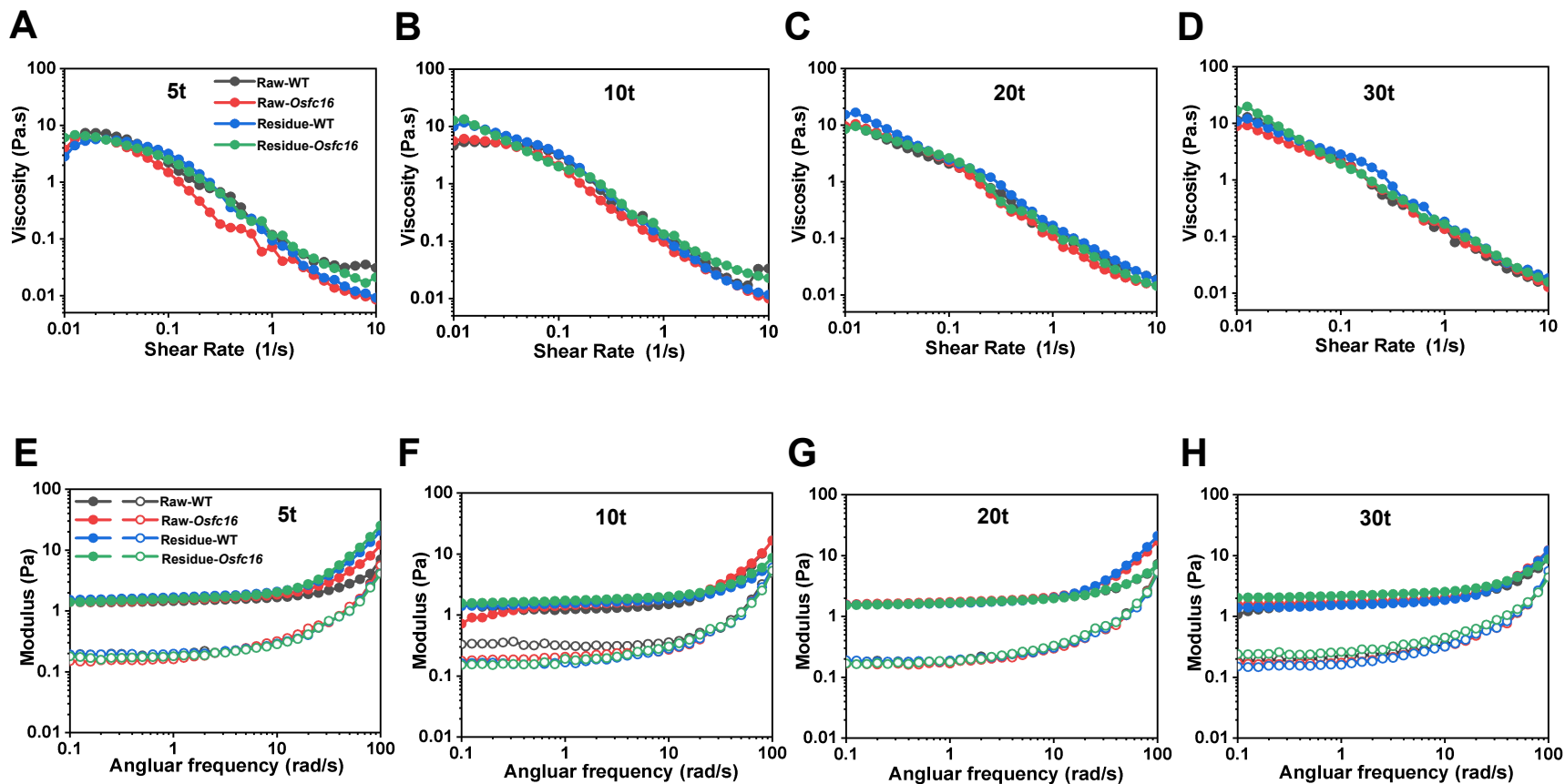
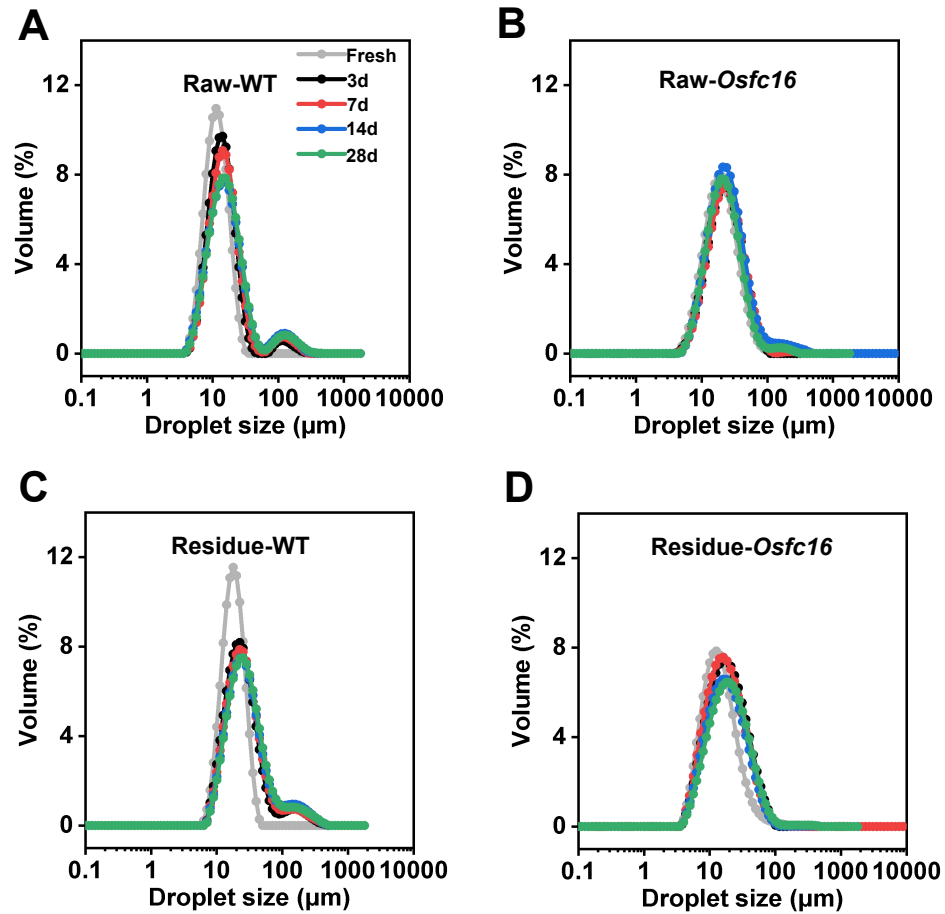


**Fig. S1** Flow chart of rice straw process to produce bioethanol and to generate cellulose nanofibrils for Pickering emulsions stabilizers and cellulases inducers.



**Fig. S2** Rheological properties of Pickering emulsions with 0.1% CNFs generated from the *Osfc16* and WT samples. (A-D) Apparent viscoelastic as a function of shear rate; (E-H) Storage modulus (closed symbols) and loss modulus (open symbols) as a function of angular frequency measured at 0.65% strain.



**Fig. S3** Particle size distribution of Pickering emulsions with 0.1% CNFs under different storage times. (A, B) HPH-20t of raw straws from the *Osfc16* and WT samples; (C, D) HPH-10t of enzymatic residues.





**Table S1** Comparison of cellulose and hemicellulose levels in raw straws and residues from direct enzymatic hydrolyses between WT(NPB) and mutant(*Osf16*)

<b>Material</b>	<b>Cellulose (% Dry Matter)</b>	<b>SD</b>	<b>Hemicellulose (% Dry Matter)</b>	<b>SD</b>
Raw-WT	29.24	0.60	21.61	0.45
Raw- <i>Osf16</i>	20.02	0.56	24.79	0.65
Residue-WT	36.28	0.36	34.24	0.81
Residue- <i>Osf16</i>	24.66	0.87	40.45	1.79

**Table S2** Characteristic chemical bonds of the FT-IR spectra presented in Fig. 7

Reported wave number (cm <sup>-1</sup> )	Observed wave number (cm <sup>-1</sup> )	Functional group	Assignment	References
829	823	C-H breathing	H-lignin	59
898	897	C-H vibration	Cellulose	59
1045	1040	C-O-C	Cellulose	60
1051	1058	C-O-C ring skeletal vibration	Hemicellulose	6
1163	1164	C-O-C asymmetric stretching	Cellulose	61
1247	1245	C-O-C stretching of aryl-alkyl ether	Lignin	59
1373	1368	C-H <sub>2</sub> scissoring	Cellulose	62
1515	1510	C=C stretching of the aromatic ring	Lignin	63
1632	1636	-C=O stretching from CO-OR	Pectin	64

Peaks highlighted in red as altered ones in two residues samples relative to raw control sample (without *T. reesei* incubation).