

ELECTRONIC SUPPORTING INFORMATION (ESI)

BIONIC LIQUID-BASED PRETREATMENT ENHANCES METHANE

PRODUCTION FROM *AGAVE TEQUILANA* BAGASSE

Jose A. Pérez-Pimienta^a, José P. A. Icaza-Herrera^b, Hugo O. Méndez-Acosta^b, Víctor González-Álvarez^b, Jorge A. Méndez-Pérez^c, Jorge Arreola-Vargas^{d,*}

^a Department of Chemical Engineering, Universidad Autónoma de Nayarit, Tepic, Mexico

^b Departamento de Ingeniería Química, CUCEI-Universidad de Guadalajara, Guadalajara, Jalisco, México.

^c Department of Engineering in Environmental Systems, Instituto Politécnico Nacional, Mexico City, Mexico

^d División de Procesos Industriales, Universidad Tecnológica de Jalisco, Guadalajara, Jalisco, México.

*Corresponding author.

E-mail address: jorgearreolav85@gmail.com

ELECTRONIC SUPPORTING INFORMATION (ESI)

Table S1. Relative changes in ATB after IL pretreatment.

Band	Assignment	% Relative change
900	Anti-symmetric out of plane ring stretch of amorphous cellulose	-2.1
1027	C-O stretching in cellulose & hemicellulose	3.2
1235	C-O stretching in lignin & hemicellulose	48.1
1321	C=O stretching of calcium oxalate	13.8
1375	C-H deformation in cellulose & hemicellulose	13.9
1622	C-O stretching of calcium oxalate	42.9
1745	Carbonyl (C=O) stretching	68.1
2900	C-H stretching (related to rupture of methyl/methylene group of cellulose)	-18.5
3348	O-H stretching (indicates rupture of cellulose hydrogen bonds)	-6.8

%Relative change = $100 * [(intensity\ of\ untreated\ solids - intensity\ of\ pretreated\ solids) / intensity\ of\ untreated\ solids]$; where positive numbers indicate reduction

ELECTRONIC SUPPORTING INFORMATION (ESI)

Table S2. Elemental content from calcium oxalate crystals in untreated and [Ch][Lys] pretreated ATB.

Sample	Element	% Mass fraction	% Atomic mass fraction
Untreated ATB	C	10.8	18.0
	O	50.3	62.7
	Ca	38.9	19.3
[Ch][Lys]-ATB	C	13.5	23.0
	O	42.9	54.8
	Ca	43.6	22.2

ELECTRONIC SUPPORTING INFORMATION (ESI)

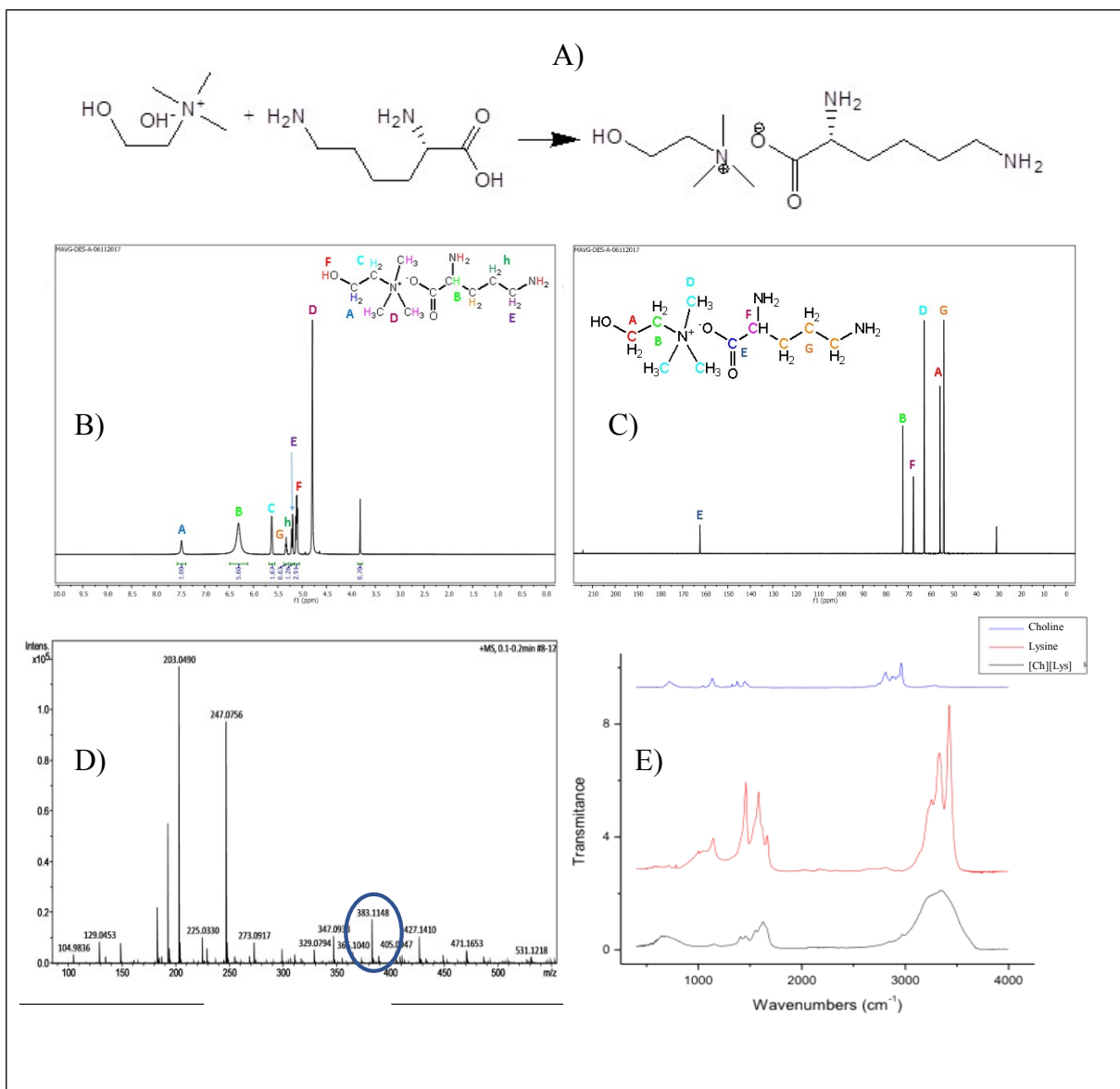


Fig. S1. A) Overall reaction to synthesize [Ch][Lys]*, B) ^1H -NMR spectra of [Ch][Lys] in D_2O , C) ^{13}C -NMR spectra of [Ch][Lys] in D_2O , D) Mass spectra of [Ch][Lys], and E) FTIR spectra of [Ch][Lys] and components.

*Synthesis was carried out according to Sun et al., *Green Chem.*, 2014, **16**, 2546–2557.

ELECTRONIC SUPPORTING INFORMATION (ESI)

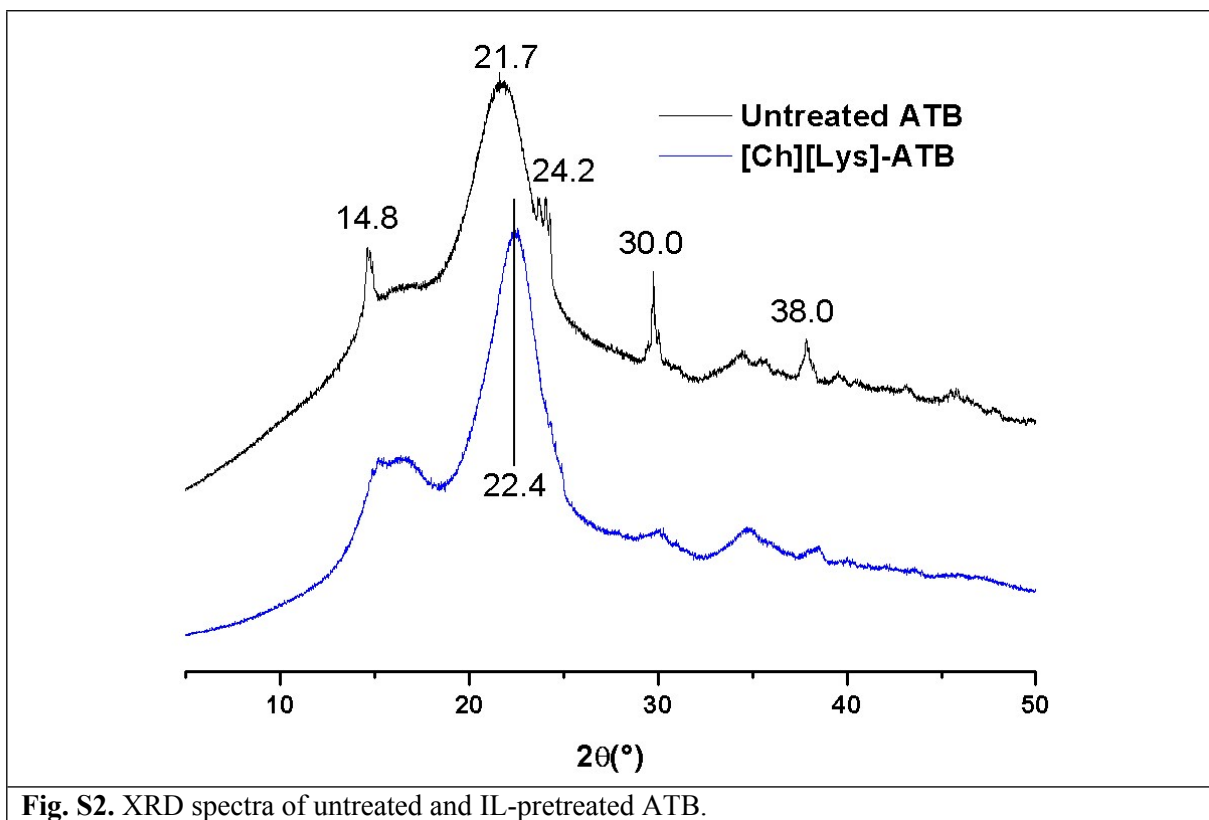
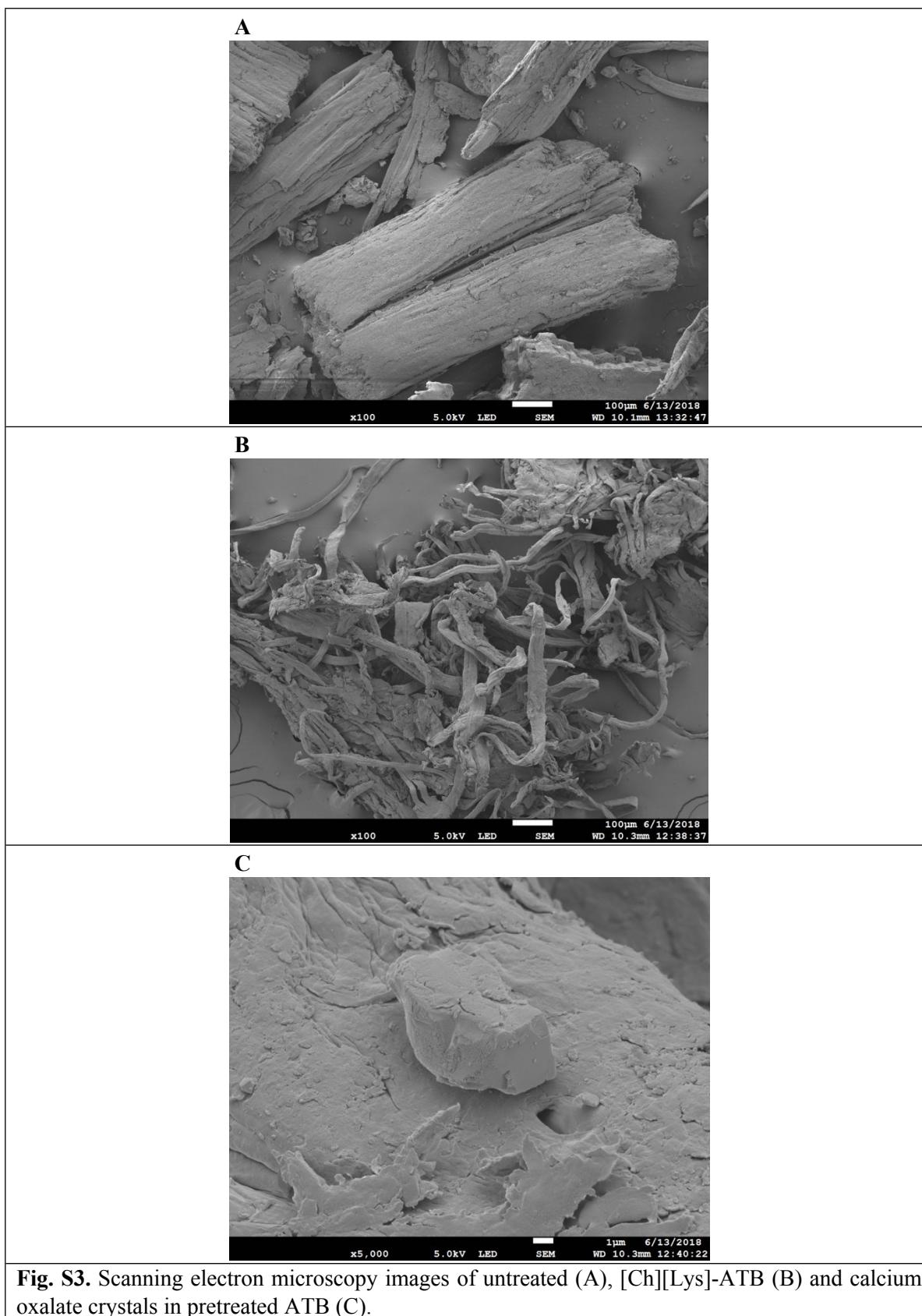


Fig. S2. XRD spectra of untreated and IL-pretreated ATB.

ELECTRONIC SUPPORTING INFORMATION (ESI)



ELECTRONIC SUPPORTING INFORMATION (ESI)

