

LIST OF ABBREVIATIONS

UNDP	United Nations Development Programme
Mtoe	Million tonnes of oil equivalent
IEA	International Energy Agency
CO ₂	Carbon dioxide
SO ₂	Sulphur dioxide SO ₂
NO _x	Nitrogen oxides
GHG	Green House Gas
U.S.	United States
IPCC	Intergovernmental Panel on Climate Change
RED	Renewable Energy Directive
EU	Europe
RFS	Renewable Fuel Standard
GOI	Government of India
GWP	Global warming potential
E27	Ethanol 27%
INDC	Intended Nationally Determined Contributions
MoPNG	Ministry of Petroleum & Natural Gas
EBPP	Ethanol Blended Petrol Programme
E10	Ethanol 10% blending
MNRE	Ministry of New and Renewable Energy
HNO ₃	Nitric Acid
H ₂ O ₂	Hydrogen peroxide
AFEX	Ammonia fibre expansion
H ₃ PO ₄	Phosphoric Acid
HCl	Hydrochloric Acid
H ₂ SO ₄	Sulphuric Acid
NaOH	Sodium Hydroxide
HMF	Hydroxymethyl Furfural
LCB	Lignocellulosic biomass
ILs	Ionic liquids
XRD	X-Ray diffraction
TGA	Thermogravimetric Analysis
DTA	Differential Thermal Analysis

FTIR	Fourier Transform Spectroscopy
CHNS/O	Carbon, Hydrogen, Nitrogen, Sulphur/Oxygen
[C ₂ mim][OAc]	1-Ethyl-3-methylimidazolium acetate
[C ₄ mim][OAc]	1-Butyl-3-methylimidazolium acetate
[C ₂ mim][Cl],	1-Ethyl-3-methylimidazolium Chloride
[C ₄ mim][BF ₄]	1-Butyl-3-methylimidazolium Tetrafluoroborate
[C ₄ mim][Cl]	1-Butyl-3-methylimidazolium chloride
[C ₆ mim][Cl]	1-Hexyl-3-methylimidazolium chloride
[C ₈ mim][Cl]	1-Methyl-3-octylimidazolium chloride
[C ₄ mim] ⁺	1-butyl-3-methylimidazolium cations
PF ₆	Tetra fluoro Phosphate
BET	Brunauer–Emmett–Teller
[Mmim][DMP]	N-methyl-N-methylimidazolium dimethyl phosphate
[Amim][Cl]	1-Allyl-3-methylimidazolium chloride
[C ₂ mim][DEP]	1-Ethyl-3-methylimidazolium diethyl phosphate
[C ₄ mim][NTf ₂]	1-Butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide
[C ₆ mim][HSO ₄]	1-Hexyl-3-methylimidazolium hydrogen sulphate
([Ch][OAc]),	Cholinium acetate
([Ch][Lys]	Cholinium lysinate
[Ch] ₂ [Asp]	Cholinium aspartate
[EOA][OAc]	Ethanolamine acetate
[C ₄ mim][N(CN) ₂]	1-Butyl-3-methylimidazolium dicyanamide
[C ₄ mim][HSO ₄]	1-Butyl-3-methylimidazolium hydrogensulfate
[C ₄ mim][SCN]	1-butyl-3-methylimidazolium thiocyanate
[Hmim][Cl]	1-Hexyl-3-methylimidazolium chloride
CH ₂	Methylene
NIR	Near InfraRed
PLC	Product Life Cycle
CrI	Crystallinity Index
WAS	Wide angle neutron scattering
SAS	Wide small angle neutron scattering
DA	Dilute Acid
NMR	Nuclear Magnetic Resonance
2D	Two Dimension

DTA	Derivative Thermogravimetric
SEM	Scanning Electron Microscope
FPU	Filter Paper Unit
ABS	Aqueous biphasic system
LOI	Lateral Order Index
TCI	Total Crystallinity Index
HBI	Hydrogen Bond Index
CLL	Cross-Linked Lignin
MgCl ₂	Magnesium Chloride
GPC	Gel permeation chromatography
2D-HSQC	Heteronuclear single quantum coherence spectroscopy
DMSO	Dimethyl sulfoxide
PW	Pinewood
SDS	Sodium dodecyl sulphate
ICSE	Instant catapult steam explosion
[C ₄ mpy][Cl]	1-Butyl-3-methylpyridinium chloride
SANS	Small-angle neutron scattering
[C ₄ mim][MeSO ₄]	1-Ethyl-3-methylimidazolium ethylsulfate
[(HSO ₃) ₄ C ₄ C ₁ m][HSO ₄]	1-(1-butylsulfonic)-3-methylimidazolium hydrosulfate
DFT	Discrete Fourier transform
HPAEC	High-performance anion-exchange chromatography
MCC	Microcrystalline Cellulose
GDP	Gross domestic product
BRDT	Biomass Research and Development Board
RS	Rice Straw
RH	Rice Husk
CS	Cotton Stalk
WS	Wheat Straw
SCB	Sugarcane Bagasse
SS	Sorghum Stalk
CRS	Corn Stover
JP	Jatropha Pruning
MS	Mustard stalk
CC	Corn Cob

NREL	National Renewable Energy Laboratory
LAPs	Laboratory analytical procedures
AIL	Acid Insoluble Lignin
ASL	Acid Soluble Lignin
IOCL	Indian Oil Corporation Ltd.
UP	Uttar Pradesh
ODW	Oven dry weight
ASTM	American Society for Testing and Materials
TG	Thermogravimetry
ICP AES	Inductively coupled plasma absorbance emission spectroscopy
KBr	Potassium Bromide
HPLC	High-Pressure Liquid Chromatography
NF	Nitrogen factor
K-T	Kamlet-Taft
RD	Reichardt's dye
4NA	4-Nitroaniline
DENA	N, N-Diethyl-4-nitroaniline
UV-Vis	Ultra-violet visible
ANOVA	Analysis of variance
S.D.	Standard deviation
DSC	Differential Scanning Calorimetry