CONTRIBUTION REGARDING THE CHARACTERIZATION OF SOME LIGNOSULFONATES

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ABSTRACT

- **Lignocellulosic materials, important natural renewable resources, contain cellulose, hemicellulose and lignins, these polymers possessing many active functional groups susceptible to reaction [1, 2].**

- **Based on the variety of functional groups, etherification, esterification, alkylation, hydroxyalkylation, graft copolymerization, crosslinking and oxidation reactions have been conducted to produce eco-materials with many practical applications [1, 2, 3].**

ABSTRACT

- **A biorefinery is a facility that integrates biomass conversion processes and equipment to produce fuels, power, and chemicals from biomass.**
- **The lignosulfonates, by-products from paper industry, represent a seriously pollution source. For a better resource reutilization and environmental protection, is interesting to use lignosulfonates as chemical reactants, or chemical modify them to improve their properties [3,4,5,6].**

CHARACTERIZATION OF LIGNOSULFONATES

- LSNH4
- LSFe = LSNH4 + Fe(NO3)3
- LSCr = LSNH4 + Na2Cr2O7
- LSFe2+Cr = LSNH4 + Fe(NO3)2 + Na2Cr2O7
- LSFe3+Cr = LSNH4 + Fe(NO3)3 + Na2Cr2O7
- LSAl = LSNH4 + AlCl3

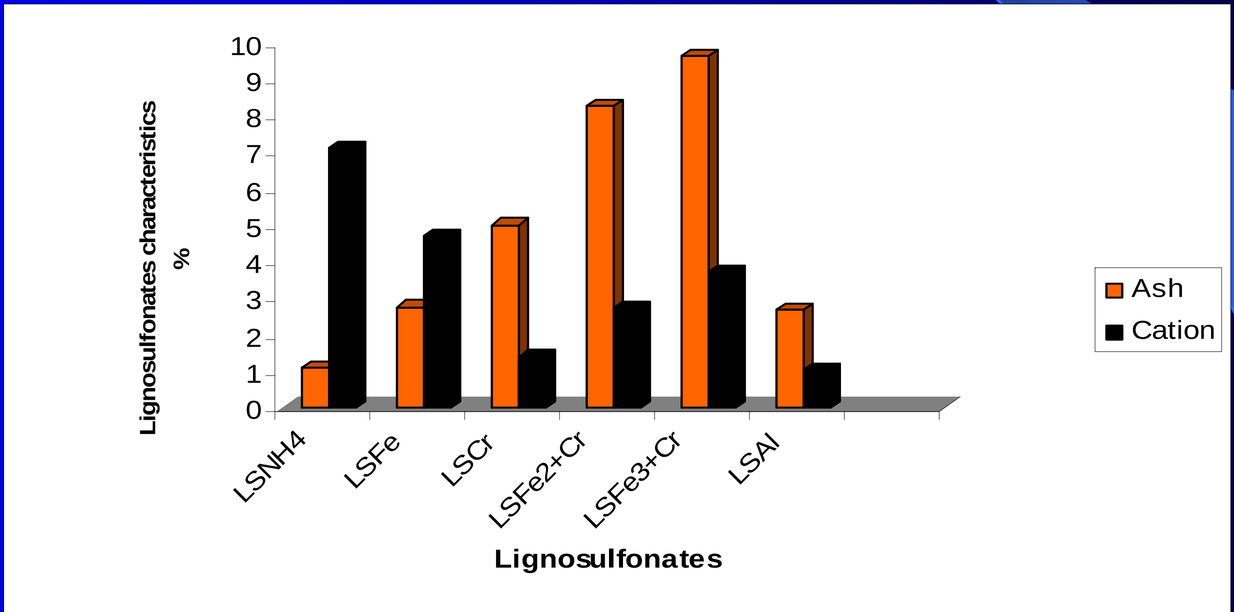
CHARACTERIZATION OF LIGNOSULFONATES

- *Hydroxyl groups*
- (a) reaction with phthalic anhydryde;
- (b) conductometric titration with LiOH

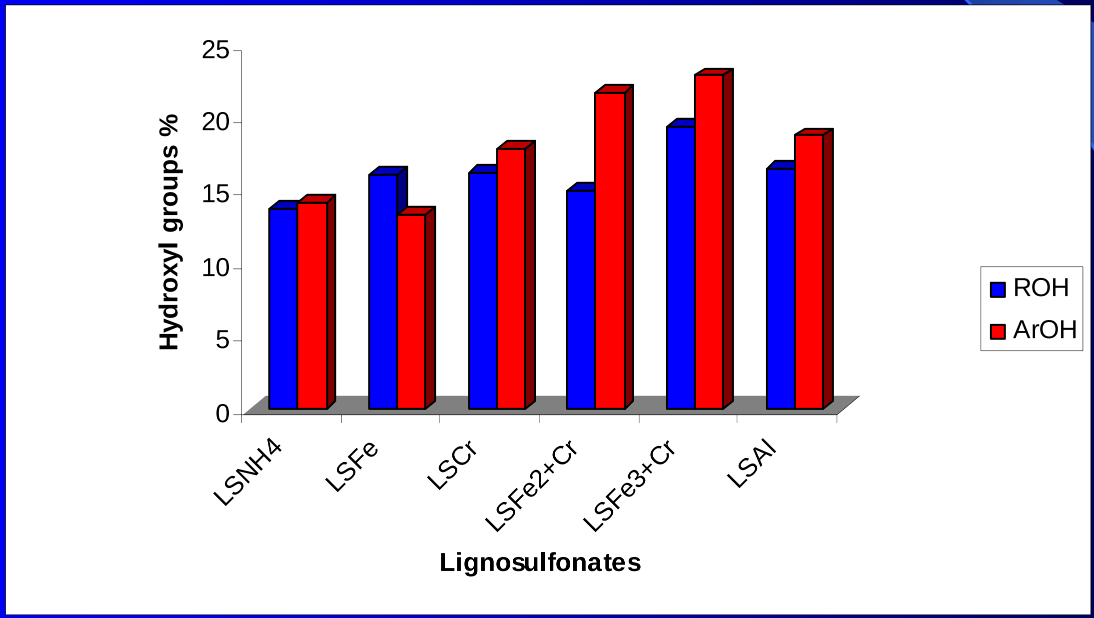
- *Carbonyl groups*
- (a) oximation method;
- (b) conductometric titration with HCl

- *Carboxyl groups*
- (a) ionic exchange method
- (b) conductometric titration with HCl

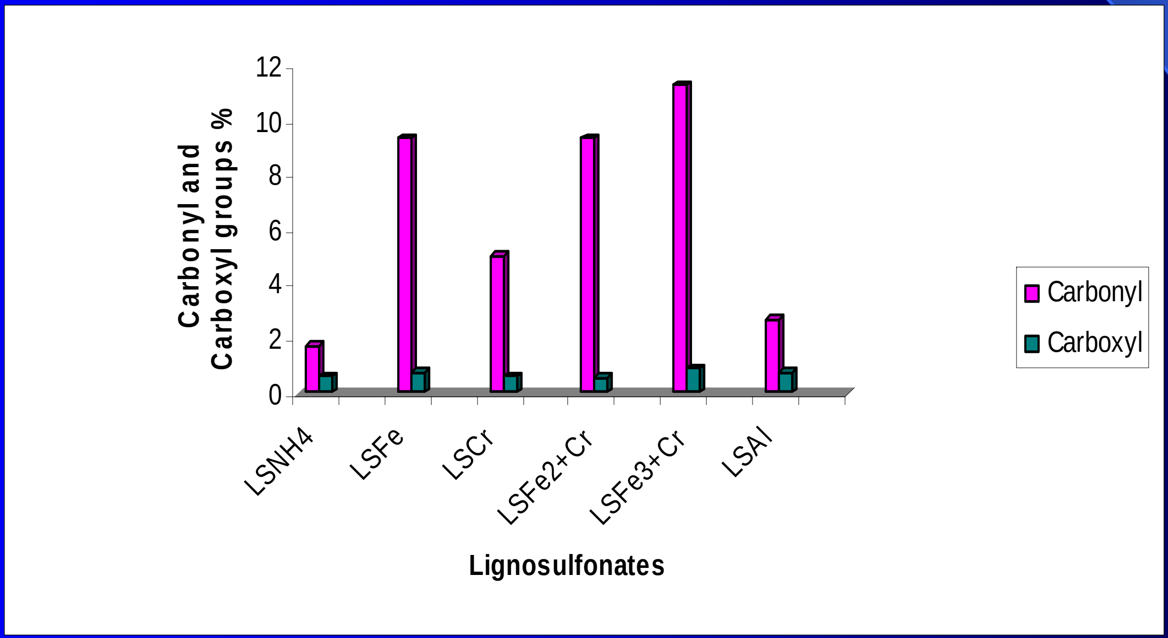
Lignosulfonates characterization



Determination of hydroxyl groups



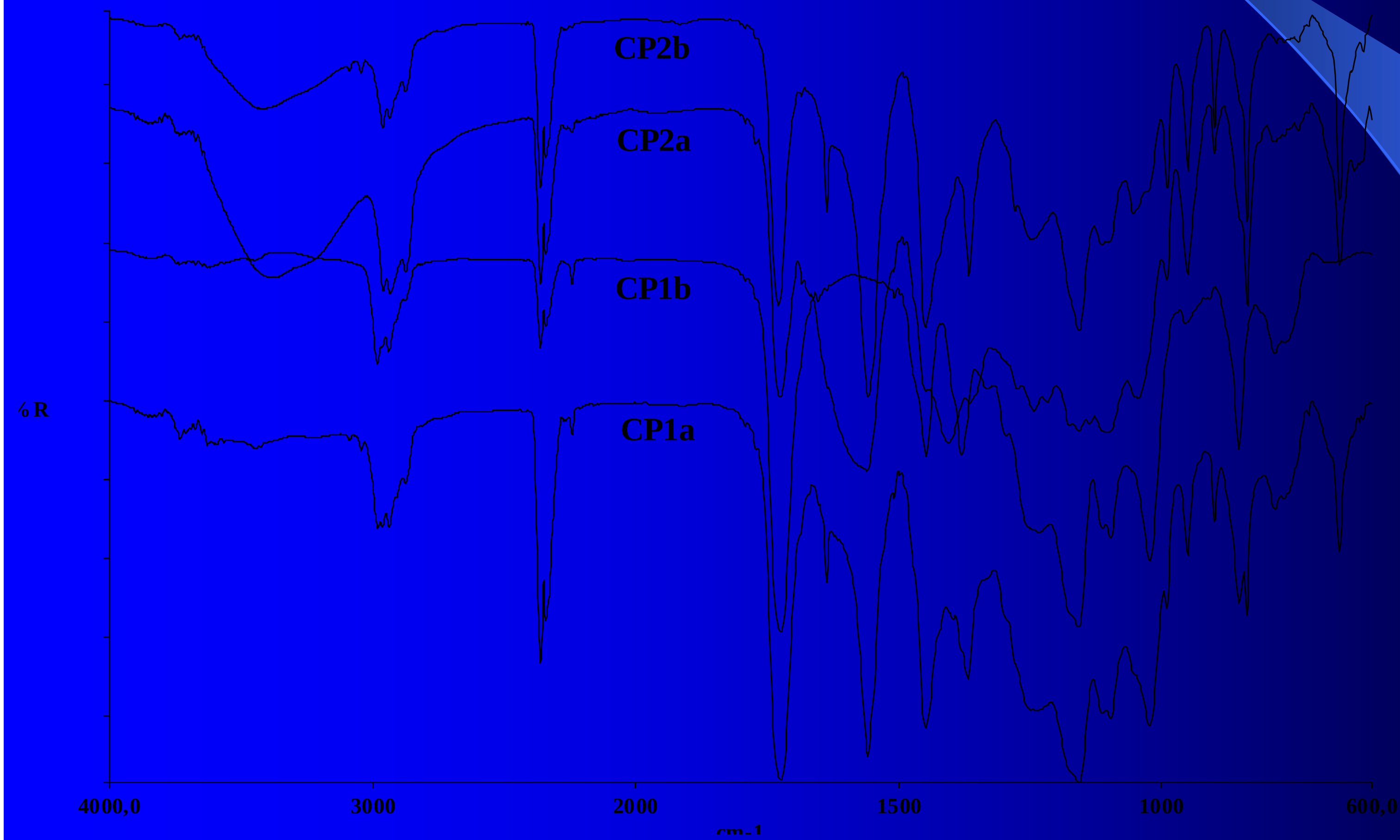
Determination of carbonyl and carboxyl groups



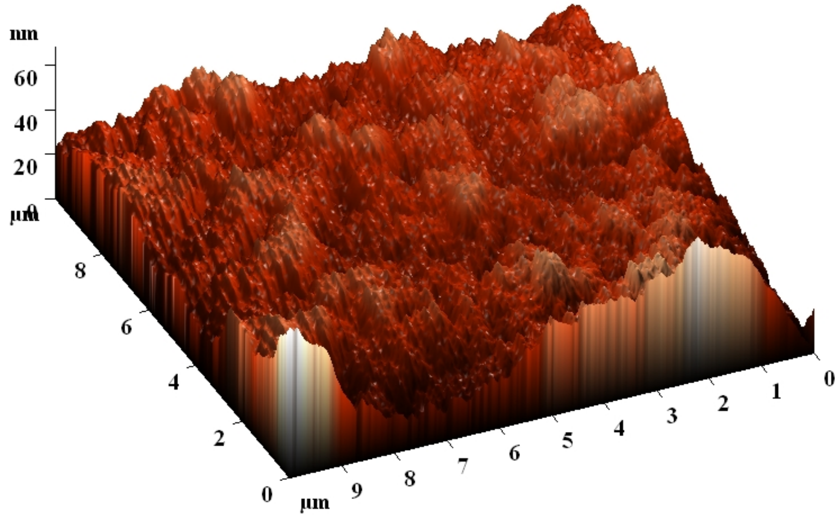
IR absorption domain of lignosulfonates

Ligno-sulfonate	IR absorption domain (cm^{-1})										
$LSNH_4$		1820-1850		1600		1432-1445			1170	1025	
LSFe	1950	1840-1860	1780	1620-1630	1505-1550	1450	1370-1390	1265	1190	1040	940
LSCr	1920-1990	1860-1890	1780	1610-1630	1510-1540	1450	1370-1390	1265	1190	1040	910-980
$LSFe^{3+}Cr$	1900-1990	1840-1890	1720-1750	1600-1620	1500-1540	1430	1350-1380	1420	1160-1170	1020-1090	915-940
$LSFe^{2+}Cr$	1930-1950	1820-1870	1720-1760	1600	1520	1440-1490	1360	1250	1100-1160	1020-1080	980
Interpre-tation	-OH (ROH, ArOH)	-OH H_2O	C=O lignin	-CH aryl	aryl lignin	-OH carbo-xyl	-CH aryl	OCH_3	$-SO_3H$	$-SO_3H$	-OH phenol
		C=O	-COOH aryl	C=O lignin	$-COO^-$	$-CH_2-$ lignin	-OH phenol	C=O lignin	$-CH_2$	aryl	
				$-COO^-$	$-CONH_2$		COOH aryl	-OH phenol			

Wood preservation agents based on acrylic copolymers, LSFeCr and ZnO nanoparticles



Wood preservation agents based on acrylic copolymers, LSFeCr and ZnO nanoparticles - AFM analysis



CONCLUSIONS

- **The chemical modification of LSNH4 with metal cations performed by hydrolysis reactions of beta-etheric bonds from phenyl propane lignin structure, followed by oxidation of released hydroxyl groups to carbonyl and carboxyl groups.**

- **Due to the increased chemical reactive potential of the lignosulfonates they were used as reactive comonomers in the emulsion copolymerization of acrylic monomers, to obtain new wood eco-preservation agents [3-6].**

References

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