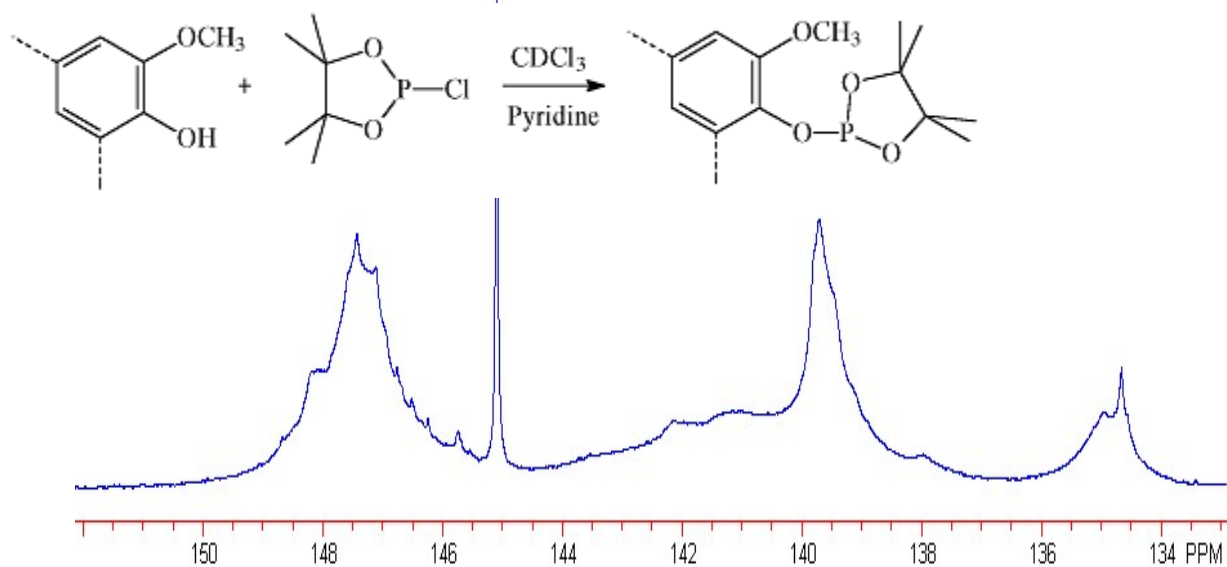


### <sup>31</sup>P NMR for Hydroxyl Groups Spectra of Residual Lignin



<sup>31</sup>P NMR spectrum of residual lignin from kappa 30 SW kraft pulp

Functional group	Integration Region/ppm	Functional Group (mmol/g)
Aliphatic OH	149.0-145.6	1.61
C5 condensed phenolic OH	144.4-140.4	0.92
5-5'-Biphenyl OH	141.7-140.4	0.49
C5 noncondensed phenolic OH	140.4-137.6	1.12
Catechol OH	139.0-138.2	0.16
<i>p</i> -hydroxyphenyl OH	138.2-137.3	0.10
Carboxyl OH	136.0-133.8	0.40