

Chemical Properties of Dissolving Pulps from Nonwood Fibers

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Dissolving pulps are high alpha cellulose, low ash pulps that are used to produce various products such as viscose rayon, cellulose esters (acetates, propionates, butyrates, nitrates) and cellulose ethers (carboxymethyl, ethyl, methyl).

Because of the high pentosan content of most nonwood fiber raw materials, the prehydrolyzed kraft process has been used for most of the laboratory testing conducted to date and for the very few commercial dissolving pulp mills that have been built based on nonwood fiber raw materials (primarily cotton and bamboo). This process, however, is complicated and expensive from both a capital and operating viewpoint. Depending on the nonwood fiber raw material, it may be possible to reduce the capital and operating costs by using a prehydrolyzed soda-anthraquinone process but this would have to be tested prior to developing a commercial facility.

Hurter provided the following data on dissolving pulps from various fiber raw materials.

Chemical Properties		Bagasse	Bamboo	Cotton	Sisal	Prehydrolyzed Hardwood Kraft	Softwood Sulphite
Ash	%	0.04 - 0.15	0.06 - 0.11	0.10 - 0.15		0.08 - 0.15	0.06 - 0.08
Pentosan	%	4.0 - 6.0	2.5 - 3.5			1.6 - 2.5	3.0 - 5.0
Alpha Cellulose	%	92 - 94	90 - 94	97 - 98	92 - 93	93 - 96	93 - 95
Beta Cellulose	%	3.5 - 5.0	1.6 - 3.0		0.1	2.1	1.5 - 2.6
Gamma Cellulose	%	1.8 - 3.2	2.5 - 3.5		7.3	1.0 - 3.0	3.2 - 8.7
Alcohol-Benzene Extraction	%	0.3 - 0.5	0.3 - 0.5		0.2 - 0.3	0.03 - 0.26	0.2 - 0.4
Degree of Polymerization		525 - 840	1026 - 1030	1440		500 - 1000	500 - 1000
Viscosity	cp	13 - 14			31.9	8 - 12	15 - 45
Copper Number		0.23		0.06		0.3 - 0.6	0.5 - 1.5