

ISOLATION AND APPLICATION OF CELLULOSE AND CELLULOSE DERIVATIVES FROM AGRO-WASTES

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Abstract—About 500 million tons of plant based agricultural and agro-industrial wastes get generated annually in India. Most of these are utilized as fodder, as domestic fuel and land filling. Modern technology based application of these wastes for production of value added products have increased the commercial application agro-wastes. Among such entities, cellulose has remarkable applications. Cellulose is popular for producing biocompatible and environmental friendly materials owing to its non-toxic nature and biodegradability. Different approaches or methods have been used for the efficacious production of cellulose. Microcrystalline and nanocrystalline cellulose are smart materials with a wide range of applications. While microcrystalline cellulose has been obtained by techniques like acid and alkali hydrolysis, steam explosion, extrusion and radiation-enzymatic approaches, nanocrystalline cellulose is produced by coupling of acid hydrolysis and sonication, oxidative hydrolysis and lyophilization, enzymatic hydrolysis and sonication, acetosolv pulping and bleaching, ultrasonic assisted TEMPO(2,2,6,6-tetramethylpiperidinyl-1-oxyl radical) mediated method etc. They have been utilized in pharmaceutical (as binders, adsorbents), food (as emulsifiers, stabilizers, anti-caking agents and fat substitutes), beverages (as gelling agents, stabilizers, suspending agents), and cosmetic (as thickeners, binders) industries. Composites of nano-crystalline cellulose have significant biocompatibility, renewability, low gas permeability and properties that make them suitable for packaging, drug delivery, tissue engineering and protective coatings. Isolation techniques for cellulose and its derivatives and trend on their application are discussed in this poster.