EUCALYPTUS FIBER MODIFICATION VIA DIELECTRIC-BARRIER DISCHARGE

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PROGRAM DESCRIPTION

• Eucalyptus fiber surface chemistry modification using atmospheric cold plasma generated by dielectric-barrier discharge (DBD).
• The main objective of this study is a deeper understanding of the DBD effects on eucalyptus fibers, in the regards to provide the DBD treatment as a new fiber modification technology to enhancement the eucalyptus papermaking physical properties.

TECHNICAL DETAILS

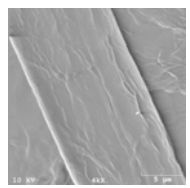
• A DBD low temperature atmospheric plasma has been applied to fully bleached eucalyptus kraft pulp sheets.
• A Sherman Laboratory Treater with a GX10 Power Generator and a HT3 High Tension Transformer has been used to DBD treat the handsheets.
• Modifications to fiber surfaces have been investigated using instrumental techniques, wet chemical methods, and the testing of physical strength and water affinity properties.

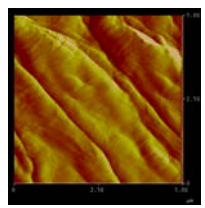
PAYOFF

• DBD treatment as a new approach to modify eucalyptus fiber properties to yield specific paper properties, specially in terms of improvement the wet strength physical properties.
• Fiber modification process without chemical additives and performed under atmospheric conditions. Also a process without any energy-intensive drying process and little, if any, chemical waste or by-products.

KEY ACCOMPLISHMENTS

• Quantify impact DBD modification on surface/acid content, strength, and water affinity properties.
• Use surface analysis techniques (SEM, AFM) to characterize impact of DBD treatment on surface.
• Explore mechanisms responsible for changes in strength and water affinity properties.





Professor AJ Ragauskas, Supervisor