Sustainable Pulping and Papermaking Technology Using Blends of Woodchips with Agricultural Residue

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Objectives
- Substitute ag-residue for woodchips
- Optimize cooking conditions
- Conduct bleaching studies
- Evaluate physical properties of paper
- Acquire insight into chemistry of ag-pulping
- Identify challenges of recovery process

The feedstock
- Wheat straw
- Corn stover
- Oat straw

The pulping process
Chemical kraft batch cooks:
WOODCHIPS + AG-RESIDUE in one digester

Bleaching studies were successful
Pulp made with ag-residue substitution level

Results
- Up to 20% of woodchips replaced
- Pulped blends using kraft process:
  165°C max., H-factor: 800, Effective alkalinity: 16%.
  Sulfidity: 22%, target kappa number: 18
- Observed significant improvement of physical properties:

Perspectives
- Lignin characterization
  (isolated from black liquor)
- Tracing the fate of xylan
  (by origin – from wood or from ag-residue)
- Comprehensive refining studies of bleached pulps
- Possible desilication options
- Other agricultural waste trials

Conclusions
- Improved physical properties are attributed to higher xylan contents
- Pulp made with ag-residue has lower cost due to availability of feedstock
- Bleaching studies were successful and xylan carried through the entire bleaching sequence.
- Paper made with alternative fiber may find applications in specialty grades

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