

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > [NR](#)
[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)
[NR](#) > [Vol.2 No.1, March 2011](#)


## ECF Bleaching with Molybdenum Activated Acid Peroxide and its Impact on Eucalyptus Pulp Properties and Effluent Quality

PDF (Size: 485KB) PP. 61-70 DOI: 10.4236/nr.2011.21008

### Author(s)

Marco António Bandeira Azevedo, Vânia Márcia Duarte Pasa, Hannu Hämäläinen, Ann Honor Mounteer, Rubens Chaves de Oliveira, Jorge Luiz Colodette

### ABSTRACT

Acid hydrogen peroxide catalyzed with molybdenum (PMo stage) is effective to decrease pulp kappa number and potentially minimize chlorine dioxide demand in subsequent ECF bleaching. This study aimed at developing cost-effective methods for applying PMo as the first stage bleaching for eucalyptus kraft pulp and evaluating their impact on pulp properties and effluent quality in relation to current ECF bleaching techniques. The PMo(EP)DP and A/PMo(EP)DP sequences proved to be most cost-effective for PMo stage application. The pulp properties and effluent quality derived from bleaching with these two sequences were compared with those of the conventional bleaching with the DHT(EP)DP sequence. The PMo(EP)DP sequence produced pulp of refinability and physical properties similar to that of the reference but the A/PMo(EP)DP one resulted in pulp of 20% lower refinability and 10% lower tearing strength. Untreated effluents of the PMo(EP)DP and A/PMo(EP)DP sequences presented similar COD, but lower AOX and color than the DHT(EP)DP effluents. None of the effluents exhibited acute toxicity. The effluents from the PMo(EP)DP sequence showed much lower BOD and BOD/COD ratio than that of the A/PMo(EP)DP one. All effluents were readily treated in bench-scale reactors, and achieved COD removal efficiencies of greater than 70%.

### KEYWORDS

Molybdenum, Bleaching, Eucalyptus, Kraft Pulp, Effluent, Pulp Quality

### Cite this paper

M. Bandeira Azevedo, V. Duarte Pasa, H. Hämäläinen, A. Mounteer, R. de Oliveira and J. Colodette, "ECF Bleaching with Molybdenum Activated Acid Peroxide and its Impact on Eucalyptus Pulp Properties and Effluent Quality," *Natural Resources*, Vol. 2 No. 1, 2011, pp. 61-70. doi: 10.4236/nr.2011.21008.

### References

- [1] M. S. Rabelo, J. L. Colodette, V. M. Sacon, M. R. Silva and M. A. B. Azevedo, " Molybdenum Catalyzed Acid Peroxide Bleaching of Eucalyptus Kraft Pulp," *BioResources*, Vol. 3, No. 3, 2008, pp. 881-897.
- [2] L. Colodette, M. C. Gomes, A. H. Mounteer and K. M. M. Eiras, " Modern High Brightness Low Impact Bleaching of Eucalyptus Kraft Pulp," *IPW Das Papier*, Vol. 1, 2006, pp. 14-17.
- [3] H. Hämäläinen, A. Parén, J. Järvelä, T. Fant, " Mill-Scale Application of a Molybdate Activated Peroxide Delignification Process in ECF and TCF Production of Softwood and Hardwood Kraft Pulps" *Proceedings of 12th ISWPC*, Madison, Wisconsin, 2003, pp. 81-84.
- [4] E. Begnor-Gidnert, P. E. Tomani and O. Dahlman, " Influence on Pulp Quality of Conditions during the Removal of Hexenuronic Acids," *Nordic Pulp and Paper Research Journal*, Vol. 13, No. 4, 1998, pp. 310-316. doi:10.3183/NPPRJ-1998-13-04-p310-316
- [5] V. Kubelka, R. C. Francis and C. W. Dence, " Delignification with Acidic Hydrogen Peroxide Activated by Molybdate," *Journal of Pulp Paper Science*, Vol. 18, 1992, pp. 108-114.
- [6] R. C. Eckert, " Delignification and Bleaching Process and Solution for Lignocellulosic Pulp with Peroxide in the Presence of Metal Additives," *Canadian Patent 1129161*, 1982.

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[NR Subscription](#)
[Most popular papers in NR](#)
[About NR News](#)
[Frequently Asked Questions](#)
[Recommend to Peers](#)
[Recommend to Library](#)
[Contact Us](#)

Downloads:	62,819
Visits:	185,459

[Sponsors, Associates, and Links >>](#)

- [7] G. I. J. Sundman, " Molybdenum - and Tungsten - Catalyzed Reactions of Acid Hydrogen Peroxide with Kraft Lignin Model Compounds and Enzymatically-Liberated Kraft Lignin," Ph.D. Thesis, SUNY College of Environmental Science and Forestry, Syracuse, New York, 1988.
- [8] F. R. Milagres, M. S. Rabelo, F. J. B. Gomes and J. L. Colodette, " Branqueamento de Polpa de Eucalipto com Sequências Curtas," Proceeding 3rd ICEP - International Colloquium on Eucalyptus Pulp, Belo Horizonte, 2007, pp. 1-5.
- [9] R. G. McDonald, " Pulp Kraft," In: R. G. McDonald, Ed., Pulp & Paper Manufacture, 2nd Edition, Vol. 1. McGraw-Hill Book Company, New York, 1967, pp. 628- 725.
- [10] T. Vuorinen, J. Buchert, A. Teleman, M. Tenkanen and P. Fagerstrom, " Selective Hydrolysis of Hexenuronic Acid Groups," Journal Pulp Paper Science, Vol. 25, 1999, 155-162.
- [11] APHA-American Public Health Association, Water Environment Federation, American Water Works