

## Publications

- Hakamäki H and Kovasin K. The effect of some parameters on brown stock washing: A study made with a pulp tester. Pulp and Paper Canada, 86 (9). T-243-249, 1985. <http://lib.tkk.fi/Diss/2003/isbn9512263165/article4.pdf>
- Helttunen J. Sellun pesuhäviön on-line mittaaminen. Master's thesis, Helsinki University of technology, Department of Forest Product Technology, 2007.
- Kivenheimo M., Kamrat E. and Kopra R. Sellutehtaan ruskean massan pesun optimoinnilla suuria säästöjä.
- Kokkonen D., Koivula K. and Kopra R. [Médición verdadera de la pérdida de lavado y su efecto en el proceso de fabricación de pasta](#), Celulosa Y Paper 4/2016, p. 16-21.
- Kopra R., Tirri T., Dahl O. (2008) Refractive index measurements for brown stock washing loss – laboratory investigations, Appita Journal 61 (5), p. 408-412.
- Kopra R., Helttunen J., Tervola P., Tirri T. and Dahl O. (2010) Refractive index measurements for brown stock washing loss – mill investigations, Appita Journal 63 (2), p. 131-136. [https://www.researchgate.net/publication/267565047\\_Refractive\\_index\\_measurements\\_for\\_brown\\_stock\\_washing\\_loss\\_-\\_Mill\\_investigations](https://www.researchgate.net/publication/267565047_Refractive_index_measurements_for_brown_stock_washing_loss_-_Mill_investigations)
- Kopra R., Karjalainen S., Tirri T. and Dahl O. (2011) Optimization of pressure filter performance using refractometer – mill investigations, Appita Journal 65 (1), p. 49-54, 94. [https://www.researchgate.net/publication/267546457\\_Optimisation\\_of\\_pressure\\_filter\\_performance\\_using\\_refractometer\\_measurements\\_-\\_Mill\\_investigations](https://www.researchgate.net/publication/267546457_Optimisation_of_pressure_filter_performance_using_refractometer_measurements_-_Mill_investigations)
- Kopra R., Kari E., Harinen M., Tirri T. and Dahl O. (2011) Optimization of wash water usage in brown stock washing, TAPPI JOURNAL 10 (9), p. 27-32.
- Kopra R., Kari E., Harinen M., Tirri T., and Dahl O. (2012) Improving brown stock washing by using online measurements – mill investigations, O PAPEL, 73 (1), p. 79-85. [http://www.revistaopapel.org.br/noticia-anexos/1359375276\\_f13aef1573c8e276d4a286dfe5e8969b\\_1259926086.pdf](http://www.revistaopapel.org.br/noticia-anexos/1359375276_f13aef1573c8e276d4a286dfe5e8969b_1259926086.pdf)
- Kopra R. Application of the refractometer in the measurement and monitoring of brown stock washing. Doctoral Dissertations, Aalto University, 2015. <https://aaltodoc.aalto.fi/bitstream/handle/123456789/15451/isbn9789526061344.pdf>
- Kopra R., Koivula K. and Dahl O. Optimization of a brown stock washing line, TAPPI JOURNAL 14 (2), p. 83-90, 2015.
- Koivula K. Improving the efficiency of a brown stock washing line. Master's thesis, Aalto University School of Chemical Technology, 2014. [https://aaltodoc.aalto.fi/bitstream/handle/123456789/14489/master\\_Koivula\\_Kimmo\\_2014.pdf](https://aaltodoc.aalto.fi/bitstream/handle/123456789/14489/master_Koivula_Kimmo_2014.pdf)
- Santos R. and Hart P. Brown Stock Washing – A Review of the Literature. [http://www.eucalyptus.com.br/artigos/outros/2014\\_Brown\\_stock\\_washing\\_review.pdf](http://www.eucalyptus.com.br/artigos/outros/2014_Brown_stock_washing_review.pdf)

## Presentations

- K-Patents. New Investigations in Brown Stock Washing Optimization. Refractive index measurements for brown stock washing loss – mill investigations, 63rd APPITA Annual Conference, Melbourne, May 20, 2009.
- K-Patents. K-Patents [video on Brown Stock Washing](#) (YouTube), March 13, 2018.
- Kivenheimo M., Kamrat E. and Kopra R. Sellutehtaan ruskean massan pesun optimoinnilla suuria säästöjä.
- Koivula K. Results of the MSc Thesis on real time Refractive Index measurement in washing process optimization and control. K-Patents European Sales Meeting, Barcelona, September 26, 2014.
- Kopra R. Improving Brown Stock Washing by On-line Measurements – Mill Investigations, 43rd Pulp and Paper International Congress and Exhibition, 2010.
- Kopra R., Karjalainen S., Tirri T. and Dahl O. Optimization of Pressure Filter Performance by Refractometers: Mill Investigations, Utilization of Real-time Refractometer Measuring Results in Chemical Pulping. 64th APPITA Annual Conference, Melbourne, April 18-21, 2010.
- Kopra R., Kari E., Harinen M., Tirri T., and Dahl O. Optimization of Wash Water Usage in Brown Stock Washing, Utilization of Real-time Refractometer Measuring Results in Chemical Pulping, TAPPI PEERS Conference, Norfolk, VA, October 17-20, 2010.

## Seminars

### Expert Seminar on how to improve pulp mill fiberline efficiency using real time process measurements Helsinki, Finland 2014

K-Patents Oy gathers pulp mill brown stock washing process experts and technical partners under one roof. The speakers are amongst the top industry experts from academic world and technical partners. The topics under discussion include the latest academic research results, field experiences and key process aids to new process technologies needed for better energy efficiency and performance.

- Olli Dahl, Aalto University. [The Need in Continuous Measurements of Material Properties and Process Optimization in a Pulp Mill.](#)
- Pekka Tervola, Andritz Oy. [Washing Advanced Process Control Solutions.](#)
- Riku Kopra, Mikkeli University of Applied Sciences. [Results of the PhD Thesis on Real Time Refractive Index Measurement in Washing Process Optimization and Control.](#)
- Kimmo Koivula, K-Patents Oy. [Results of the MSc Thesis on Brownstock Washing Control and Optimization at Kaukas Pulp Mill.](#)
- Pasi Immonen, Andritz Oy. [Operation of multi-stage Drum Displacer and optimization possibilities with continuous process measurements.](#)
- Tapio Jokinen, Andritz Oy. [From real-time process data to advanced optimization control and improved mass, material and energy balances.](#)
- Jarmo Kosunen, Honeywell Oy. [Control Performance Monitor.](#)

### Expert Seminar on Advanced Brown Stock Washing Optimization Solutions Stockholm, Sweden, 2011

K-Patents Oy gathers pulp mill brown stock washing process experts and technical partners under one roof. The speakers are amongst the top industry experts from academic world and technical partners.

- Olli Dahl, Aalto University. [Brown Stock Washing Efficiency - Past, Today and Future.](#)
- Riku Kopra, Mikkeli University of Applied Sciences. [Brown Stock Washing Optimization and Research Studies Field Results.](#)
- Erkki Kari, K-Patents Oy. [BSW Measurement In-line Analysis and Optimization.](#)
- Marko Harinen, Stora Enso Oyj. [Advancing Real-time Dry Solids Measurements in the Brown Stock Washing Control.](#)
- Juri Lahtinen, Andritz Oy. [Washing Advanced Process Control Solutions.](#)
- Erkki Räsänen and Antti Puustinen, Kemira Oyj. [How chemistry can help Brown Stock Washing operations.](#)