PERFORMANCE OF *EUCALYPTUS GLOBULUS* PULP FOR RECYCLING AS COMPARED WITH SOFTWOOD KRAFT PULP FOR PACKAGING PAPERS

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ABSTRACT

The scope of this work is to evaluate the recyclability potential of a hardwood and a softwood unbleached kraft pulps, leading to a sound basis for comparison and even to support a decision among fibers according to the performance achieved. The influence of successive recycling cycles (up to 10 cycles) on the fibers morphology, pulp suspension drainability, water retention capacity and hand-sheets mechanical properties were studied for a *Eucalyptus globulus* and *Pinus sylvestris* unbleached kraft pulps. The performance of these pulps as liners and corrugating mediums for packaging was also evaluated.

A comparative study of the recycling potential of the hardwood and softwood unbleached kraft pulps was carried out starting with the same initial tensile index of 70 N m/g, burst index above 3.5 kPa m^2/gand short span compression index above 17.5 N m/g (as required for a brown kraftliner paper), this is considered as recycling cycle 0 (R0). Each pulps was refined in a PFI lab refiner according to ISO 5264-2 method. For the following recycling cycles, R1 to R10, the refining treatment was the same for both pulps, with a slight refining of 500 PFI rotations, in order to enhance some reinforcement capacity of these recycled fibers in the formation of packaging recycled papers. Fiber and paper characterization were performed on R0, R1, R2, R4, R6, R8 and R10 cycles. In each of these cycles, fiber suspension was analyzed for the Schopper-Riegler value, water retention capacity, hornification and biometric characteristics. Microscopic analysis on the fiber cross section was also performed for each consideredcycle. In each cycle, the non-used pulp in the production of 65 and 120 g/m^2 hand-sheets, were converted to high grammage laboratory sheets (1000 g/m^2) in a Rapid-Köthen former and dried at 120°C, for one hour to simulate papermaking process. These paper-like structures were used in the subsequent recycling cycle of disintegration, refining, handsheets preparation and drying. Additionally, chemical and physical characterization of pulp fibers was performed on selected cycles (R0, R2 and R10), such as extractive content, acid insoluble and soluble lignin content and carbohydrates analysis.

The requirements for brown kraftliner and for high performance recycled fluting grades is preserved for *E. globulus* pulp during all the ten recycling cycles, evidenced by the moderate decrease of burst index, crushing resistance index and by short-span compression index, whereas the *P. sylvestris* pulp loses this rating after the second cycle. These results strongly support the higher performance of the *E. globulus* pulp in recycling when compared with the softwood kraft pulp, in the perspective of packaging papers.

Keywords: eucalyptus, kraft pulp, kraftliner, recyclability, packaging