Statistical Evaluation of the Effect of Refining on Fibre Charge of Bagasse Pulp

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ABSTRACT

The aim of this work was to study the influence of refining on various properties of bleached bagasse pulp such as freeness, specific surface area, specific volume, surface charge, total charge and paper properties. These parameters are quantitatively determined for pulp freeness levels between 225-430 ml CSF, which are important for approach flow, and wet end paper making operations. The results on refining conducted in PFI mill indicated that specific surface area and specific volume of the pulps as determined by permeability tester and water retention value (WRV) as determined by Centrifuge method increased with increased refining. The surface charge, as determined by particle charge detector using poly-DADMAC (poly diallyl dimethyl ammonium chloride), also increased with refining. However, the total fibre charge, as determined by conductometric titration, is not affected by refining. The increases in specific surface area of pulps by refining resulted in a higher fibre surface charge and also better fibrefibre bonding. The experimental data are subjected to statistical regression analysis to develop linear univariate regression models, which are found to be accurate with regression coefficients, R^2, close to unity. The comparison of model predicted data and the experimental data shows an excellent agreement between them.

Key words: Beating/refining, Surface Charge, Total Charge, Specific Surface Area, Specific Volume, Water Retention Value (WRV) and Paper Properties.