

Modified Oxygen Pretreatment of Unbleached Pulp of Indigenous Raw Material For Better Bleachability

Priti S.Lal, Vimlesh Bist, Ravi Godiyal and T.K.Roy

ABSTRACT

The oxygen pretreatment of unbleached pulp of fibrous raw material used for papermaking is world wide well established technology for reduction of pulp kappa number. In context of Indian paper industry, the indigenous raw material like bagasse, wheat straw, eucalyptus and bamboo has responded well at laboratory scale. Though there are only few mills (based on hardwood, bamboo and bagasse) which has installed the oxygen pretreatment technology in their fiber line.

The kappa number reduction after oxygen pretreatment for pulp of different indigenous raw materials ranges between 40-60%, The reduction of unbleached pulp kappa number further lead to low bleach chemical demand and lower effluent generation during bleaching, depending on the quality of raw material and types of lignin. But it is observed that normally industrial oxygen treatment operate around 20% below their delignification potential i.e. compared to what can be obtained in laboratory experiments.

The efficiency of oxygen treatment technology is of great concern considering the scale of operation in Indian Paper Mills and high cost of technology. Literature reveals number of studies carried out to enhance the efficiency of oxygen treatment technology. It includes the treatment of oxygen along with some additional chemical, change in treatment conditions etc.

To meet out norms set by government for paper mill effluent discharge, Indian paper mills are looking for the modern technological options, which are cost effective and support their scale of operation. In the present study, the work is carried out on oxygen treatment and modified oxygen treatment (treatment along with peroxide) of pulp of Indian raw materials as bagasse, wheat straw, eucalyptus and bamboo. A comparison of characteristics of unbleached pulp, oxygen treated pulp and modified oxygen treated pulp followed by DEpD bleaching was carried out.

The study results in substantial drop in unbleached pulp kappa number after modified oxygen treatment, viz. 80, 76,62,63% compared to oxygen treatment viz.53,62, 47 and 55% respectively for bagasse, wheat straw, eucalyptus and bamboo. There was not any appreciable difference in pulp intrinsic strength after modified oxygen treatment and it has been preserved during the treatment (962, 823, 569 and 734 cc/g) compared to oxygen treated pulp (816, 863,544 and 750 cc/g) respectively for bagasse, wheat straw, eucalyptus and bamboo pulp. There is significant gain in brightness after modified oxygen treatment viz. 54, 66, 51 and 46 % ISO compared to oxygen treatment viz.38, 48, 41, 37 % ISO respectively for bagasse, wheat straw, eucalyptus and bamboo . The impact of better delignification and better initial brightness is also observed in DEpD bleached pulp brightness. There is 1-4 point gain in DEpD bleached pulp brightness for modified oxygen treated pulp as 88,87,85 and 86.5 % ISO compared to oxygen treated pulp 85, 85.4, 83 and 83.5 % ISO respectively for bagasse, wheat straw, eucalyptus and bamboo .