

Reduction in Pollution Load and Pulp Quality Improvement with Enzyme, Alkali-Oxygen Delignification Prior to Mill Pulp Bleaching

Mishra R.P., Khare Alok., Maheshwari G.D., Bhargava G.G., Thusu N.K.

ABSTRACT

Oxygen delignification renders pulp readily accessible to xylanase enzyme and increases the bleaching benefits of enzyme treatment. In this paper unbleached pulp was treated with different dosages of VLBL enzyme and reaction temperature was maintained at 40^o, 50^o and 60^oc for 60 minutes to get higher pulp kappa reduction. Resultant pulps consume less in bleach chemicals to achieve desired brightness while pulp quality is observed to be superior to enzyme untreated bleached pulp.

In other set of experiment pulp of Kappa 19.0 was bleached under C-Ep-H-D, O-C-Ep-H-D, O-Enz-C-Ep-H-D and Enz-O-C-Ep-H-D bleaching sequences by incorporating enzyme stage before and after Alkali-Oxygen delignification. By application of Alkali-Oxygen delignification, pulp Kappa was reduced by 38.0 %, which has helped in considerable reduction of total bleach consumption under O-C-Ep-H-D sequence, compared to C-Ep-H-D sequence.

By addition of enzyme prior and after Alkali-Oxygen delignification stage the total chlorine consumption could be reduced by more than 50% under Enz-O-C-Ep-H-D and O-Enz-C-Ep-H-D sequence respectively compared to blank experiment.

Physical strength properties of the bleached pulp under Enz-O-C-Ep-H-D sequence were observed to be inferior both to O-C-Ep-H-D or O-Enz-c-Ep-H-D bleaching sequences. Physical strength properties of the bleached pulp in O-Enz-C-Ep-H-D sequence were better than other bleaching sequences.

The pollution load in terms of COD, dissolved solids and chloride content was found to be on higher side in Enz-O-C-Ep-H-D sequence compared to O-Enz-C-Ep-H-D sequence but lower than O-C-Ep-H-D and C-Ep-H-D bleaching sequences.