

TAED Activator for Peroxide Bleaching of Recycled Pulp

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Outline

- Peroxide used in ThermoMechanical Pulp, Chemical Pulp and Recycled fibers
- TAED Activator and Its Benefits
- Experimental
 - Process description
 - Effect of TAED Activated Peroxide on Recycled Fibers Properties
- Conclusions



Background

- Peroxide Bleaching on Recycled Fibers
- Hydrogen Peroxide is a weak oxidizer, its in-situ decomposition and higher costs
- Benefits of TAED activator on properties
- Process Variable Effect of TAED-activated peroxide – Time, TAED Charge, Temperature and DTPA Dosage



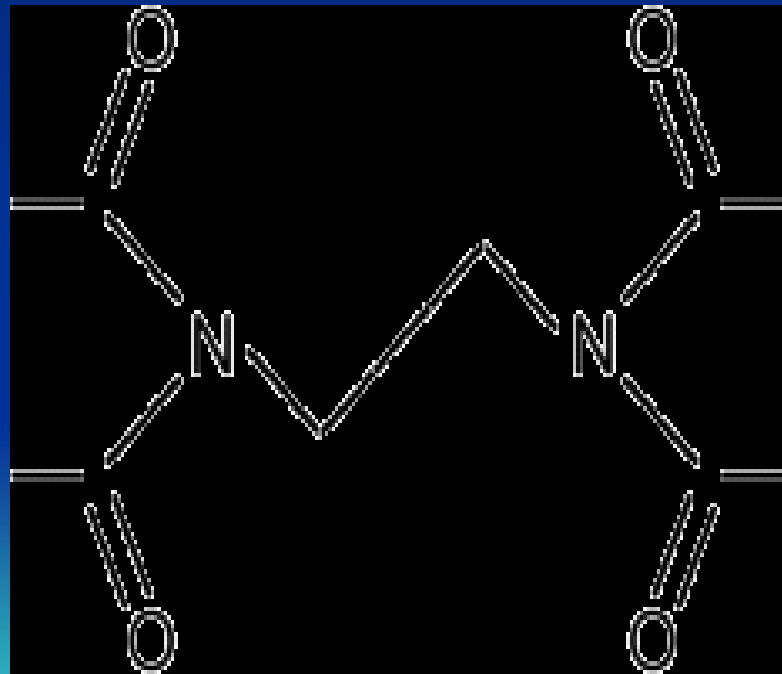
TAED Activator-Benefits

- Improved bleaching conditions
 - Lower T; Less t and lower pH
- Improved pulp properties
 - better brightness
 - more brightness stability
 - better bulk
 - higher strength



How does TAED work? (Tetra Acetyl Ethylene Diamine)

- Generates peracetate ion from peroxide; prevents decomposition of H_2O_2



TAED Activated Peroxide Bleaching

- TAED activator allows peroxide bleaching
 - Lower temperature
 - Less alkaline conditions (pH~8)
 - Chemical usage reduction
 - Increased bulk
 - Reduced reaction time
 - Decreased brightness reversion

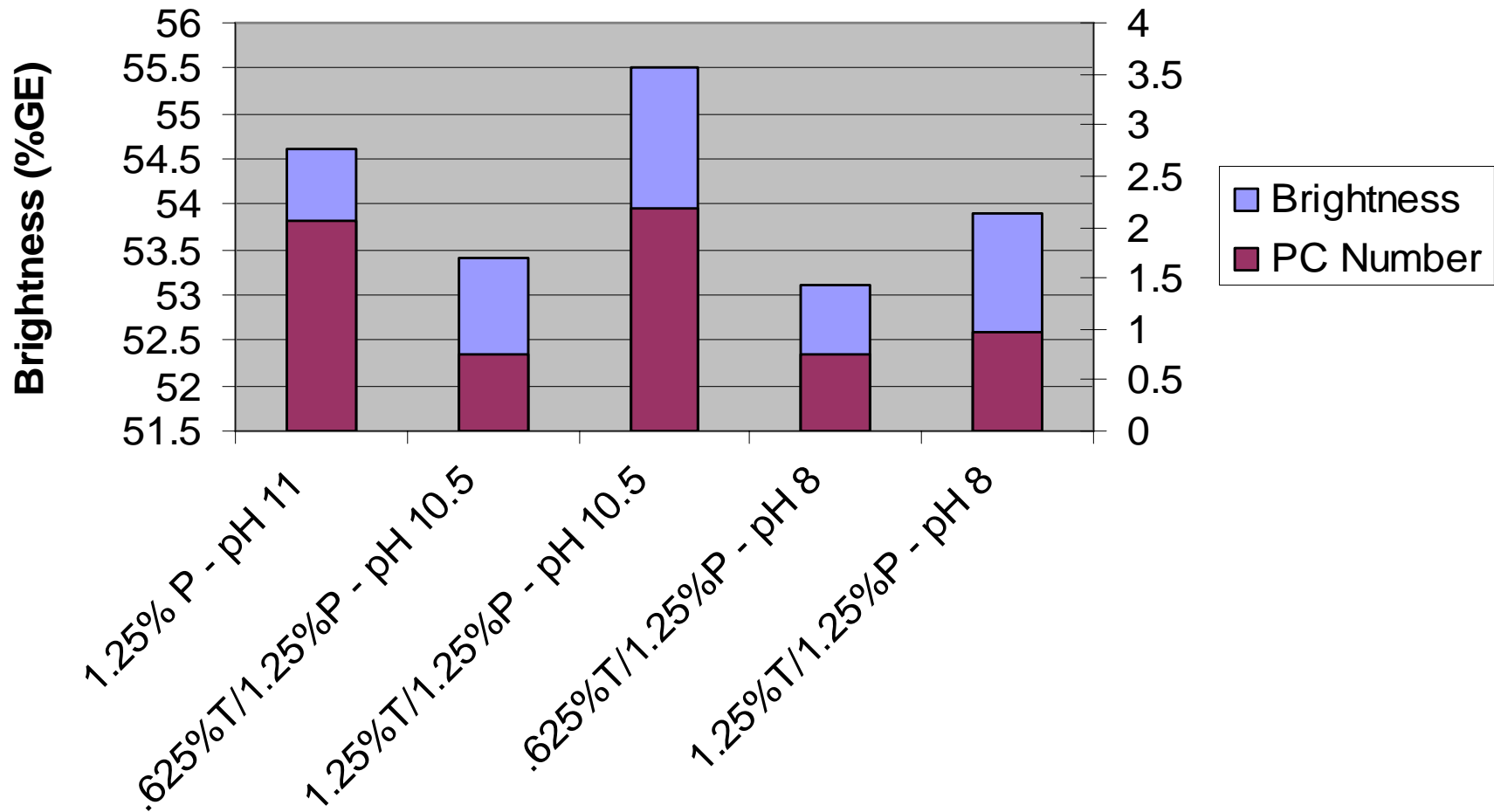


Process

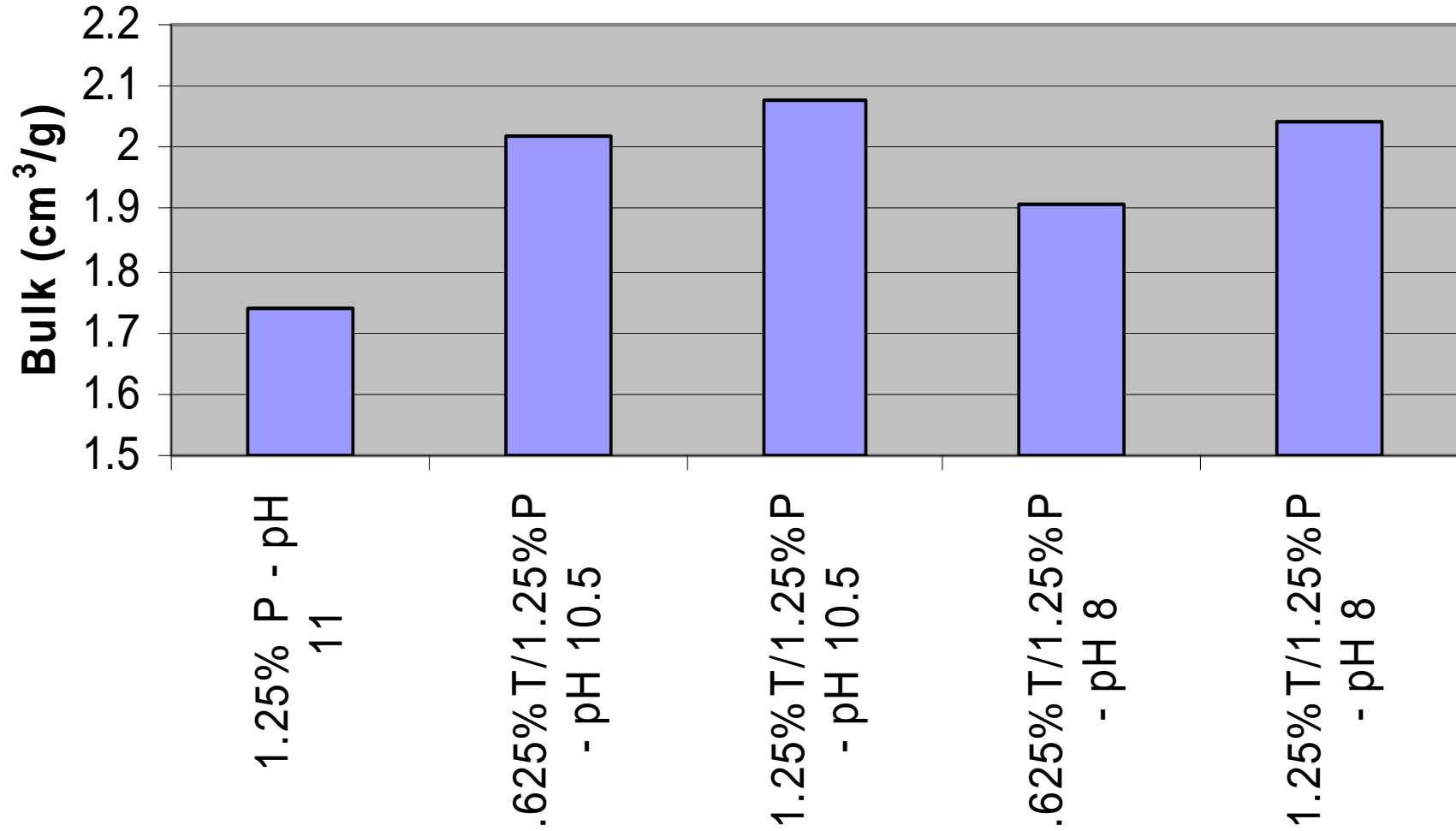
- The pulp was placed in a plastic bag, heat sealed, and fully immersed in a pre-heated constant temperature water bath. The pulp was mixed every fifteen minutes for the duration of the experiment.



Recycled Brightness and Color Reversion



Recycled Bulk



Effect of pH, TAED Charge and reaction time

% TAED	Time (Hr)	pH	Brightness (%GE)
0.625%T:1.25%P	1	8	53.3
0.625%T:1.25%P	1	10.5	53.6
1.25%T:1.25%P	1	8	55.02
1.25%T:1.25%P	1	10.5	56.8
0.625%T:1.25%P	2	8	54.6
0.625%T:1.25%P	2	10.5	55.7
1.25%T:1.25%P	2	8	56.3
1.25%T:1.25%P	2	10.5	57.1

Effect of DTAP on Optical and Physical Properties

	Pre-Aging (%GE)	Post-aging (%GE)	Bulk (cm ³ /g)	PC	Tensile (N)
1.25%P - pH 11, 0.0% DTPA	55.5	54.6	1.74	2.07	50.7
0.625%T/1.25%P - pH 10.5, 0.05% DTPA	53.7	53.4	2.02	0.75	51.6
0.625%T/1.25%P - pH 8, 0.05 % DTPA	53.4	53.1	1.91	0.76	53.8
1.25%T/1.25%P - pH 8, 0.05 % DTPA	54.3	53.9	2.04	0.97	54.6

Recycled Pulp Tensile Strength

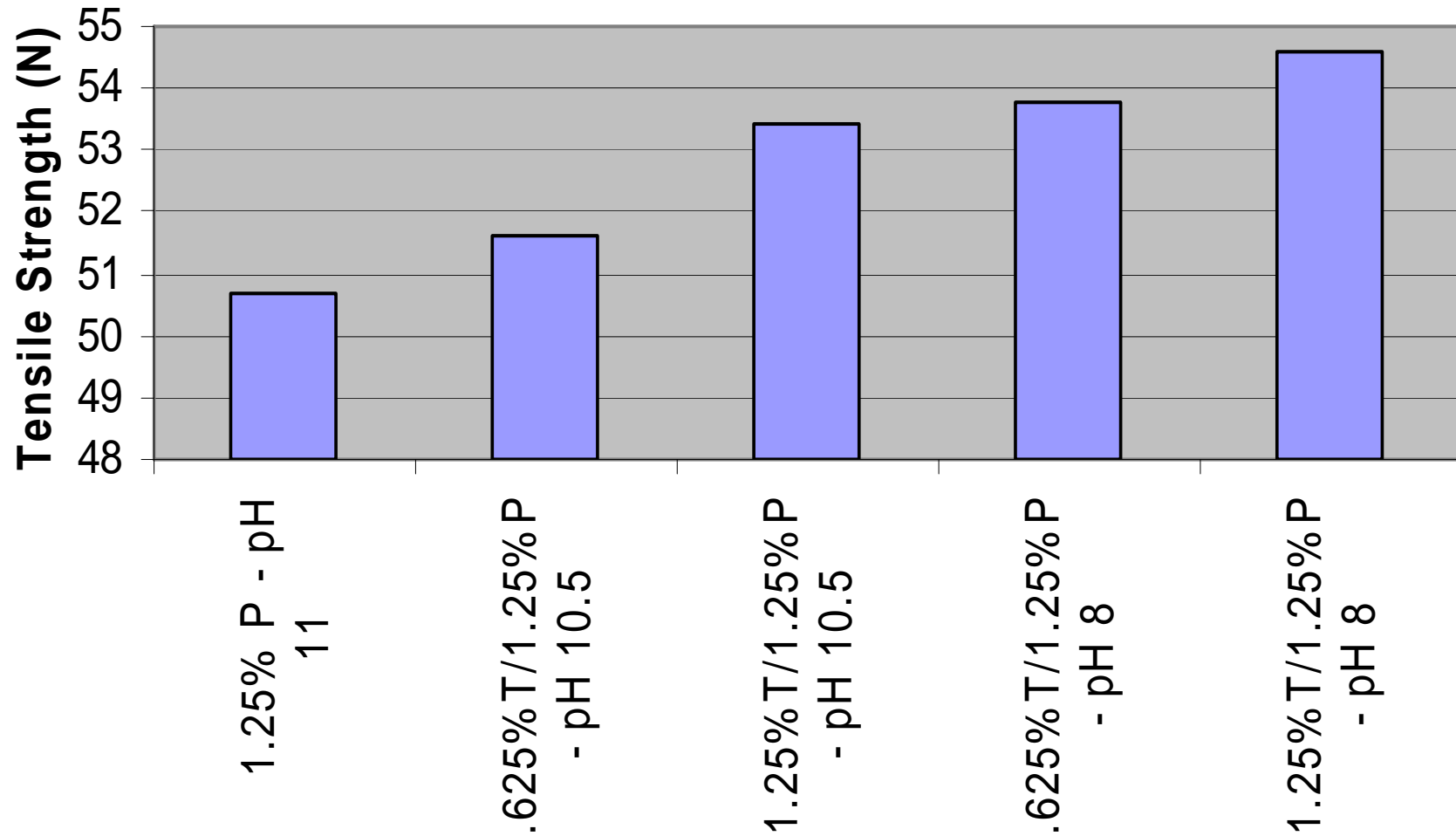


Table 1. Four Factors Experimental Design TAED in QT Stage

Four factors experimental design has been performed of TAED stage in a QT stage.

%TAED (0.625%T/1.25%P vs. 1.25%P),

Reaction Time (2 hours vs. 1 hour)

pH (10.5 vs. 8) and %DTPA (0.05 vs. 0)



Recycled Pulp Improvement

- Brightness can be improved with 1.25% P and TAED at pH of 10.5 and better at 2 hr
- 53% improvement in color reversion (PC number)
- Minimum bulk increase of 10%
 - 19.5% in excess TAED
- 7.5% increase in tensile strength



Conclusions

- TAED is an excellent peroxide activator (low temperature, Low pH alkaline)
- Reaction time, pH and TAED charge had significant effects on the brightness; especially reaction time at low pH levels and low chemical charges; and the addition of DTPA increased tensile 10% and improved brightness stability
- increased bulk (20%), reduction reaction time (50%), and reversion decreased; and lowered some of chemicals usage.

THANK YOU !

- *QUESTIONS?*

