

# Bleaching of mechanical pulps using $\text{Mg}(\text{OH})_2$

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# Background

- ❑ Europiren B.V. would like to investigate the possibility to use magnesium hydroxide as alkali source under BleachMag trademark instead of NaOH for bleaching mechanical pulp.
- ❑ The mechanical pulp should be chelated and bleached with NaOH and three different qualities of  $Mg(OH)_2$

# Chelating stage and bleaching

## ❑ **Q-stage:**

4% consistency

Temperature 60 °C

pH 6.5

Time 30 min

## ❑ **Bleaching:**

25% consistency

Temperature 70 °C

Time 180 min

Hydrogen peroxide 40 kg/t

Sodium silicate 25 kg/t



Mixer for mixing chemicals into pulp at consistency 25-30%

# Bleaching conditions

- 1) NaOH, dosage 25 kg/t
- 2) 25% NaOH+75%Mg(OH)<sub>2</sub> from Competitor 1 (synthetic MDH), dosage 15, 20 and 30 kg/t
- 3) 25% NaOH+75%Mg(OH)<sub>2</sub> from Competitor 2 (synthetic MDH), dosage 15, 20 and 30 kg/t
- 4) NaOH+75%Mg(OH)<sub>2</sub> from Europiren B.V. (BleachMag trademark), dosage 15, 20 and 30 kg/t

# Results bleaching

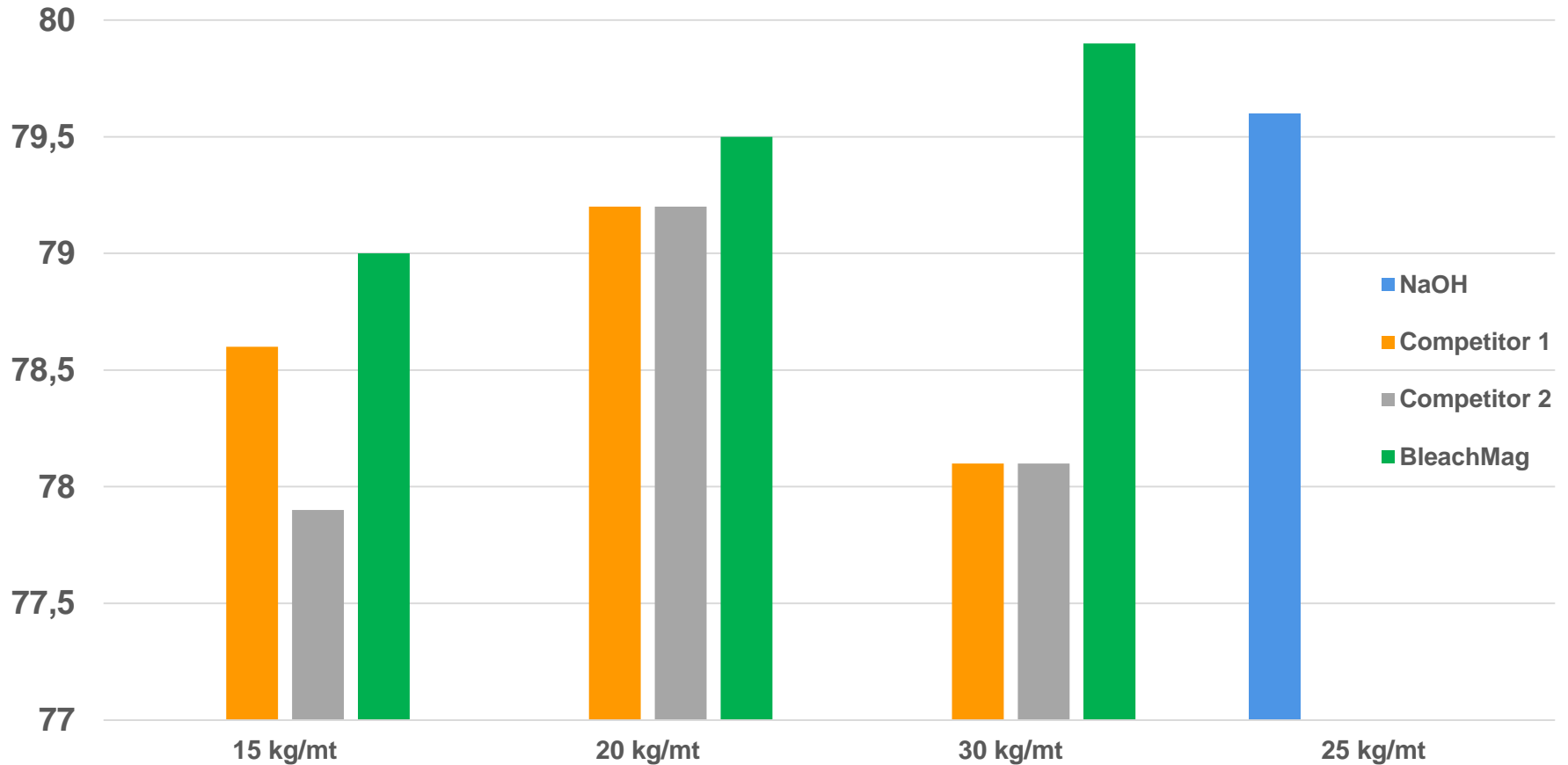
Sample	End pH	Residual peroxide (g/l)	Final Brightness (%-ISO)	Final Brightness ( $\pm$ %-ISO)
NaOH: 25 kg/t	8.54	3.41	79.6	0.10
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1</b> , 15 kg/t	7.18	4.37	78.6	0.25
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1</b> , 20 kg/t	7.17	4.23	77.9	0.31
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1</b> , 30 kg/t	7.38	4.25	78.1	0.21
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2</b> , 15 kg/t	7.27	4.57	79.2	0.25
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2</b> , 20 kg/t	7.68	4.23	79.2	0.15
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2</b> , 30 kg/t	8.23	3.37	78.1	0.22
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag</b> , 15 kg/t	7.90	3.69	79.0	0.17
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag</b> , 20 kg/t	7.93	2.77	79.5	0.18
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag</b> , 30 kg/t	7.63	2.78	79.9	0.11

**Start pulp: 66.5  $\pm$  0.08 %-ISO;**

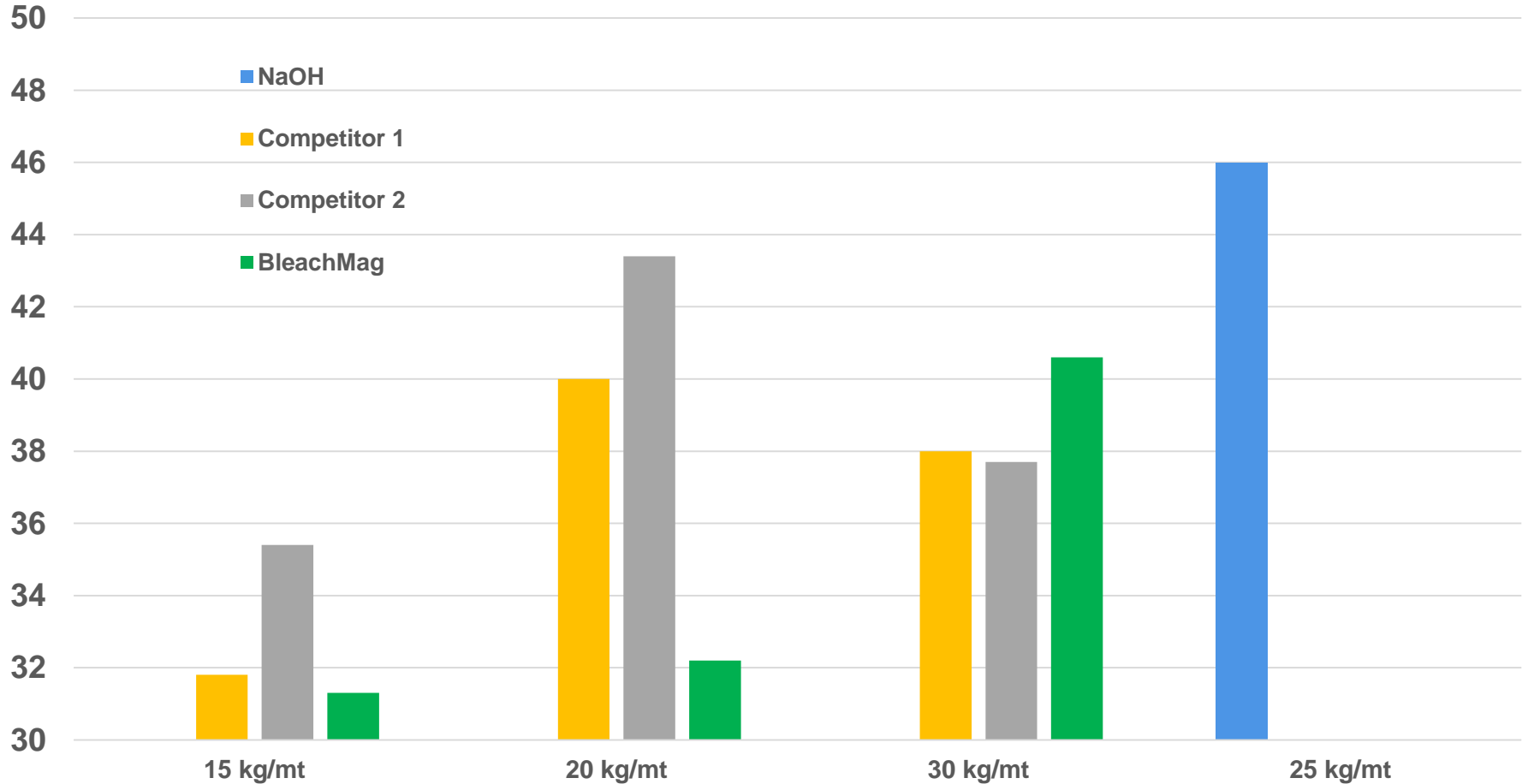
# Results bleaching

Sample	Residual peroxide (% of applied)	Peroxide consumed (% of applied)	COD (kg/t)
<b>NaOH: 25 kg/t</b>	25.5	74.5	46.0
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1, 15 kg/t</b>	32.8	67.2	31.8
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1, 20 kg/t</b>	32.0	68.0	40.0
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 1, 30 kg/t</b>	31.9	68.1	38.0
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2, 15 kg/t</b>	34.2	65.8	35.4
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2, 20 kg/t</b>	31.8	68.2	43.4
25% NaOH+75%Mg(OH) <sub>2</sub> <b>Competitor 2, 30 kg/t</b>	25.3	74.7	37.7
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag, 15 kg/t</b>	27.7	72.3	31.3
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag, 20 kg/t</b>	20.8	79.2	32.2
25% NaOH+75%Mg(OH) <sub>2</sub> <b>BleachMag, 30 kg/t</b>	20.9	79.1	40.6

# Brightness development



# COD (ΧΠΚ) formation





# Conclusions and recommendations

- ❑ Hydrogen peroxide was stable in contact with the dispersants at 70 °C, 180 min
- ❑ End pH after bleaching was highest for NaOH (ca 0.5-1.0 pH units)
- ❑ Competitor 1 magnesium hydroxide had the lowest end pH and the lowest brightness
- ❑ Eupopirens BleachMag magnesium hydroxide had the lowest residual peroxide, but also the highest brightness compared to the other magnesium hydroxides
- ❑ NaOH showed the highest COD
- ❑ BleachMag had the lowest COD, 25% lower than NaOH