GREEN CHEMISTRY TO ENHANCE PULP BLEACHING

TECHNOLOGY PLATFORM DERIVED FROM PROBIOTICS

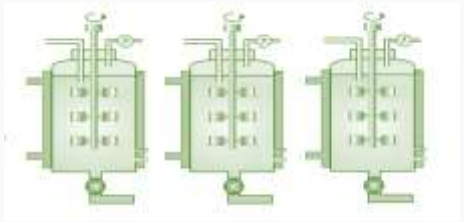
Presentation Summary

- About Probiotic Technology
- Uniqueness of the Technology
- Product Range
- Bleaching Aid Case Study
- Key Benefits

Patented Technology

PROBIOTICS
Completely organic , safe for human use and naturally extracted bacteria

Biodegradable and safe ingredients



Green Manufacturing Process

Final Products
Safe, Bio-degradable and non-toxic formulations

The unique, first-in-the-world **proprietary technology** uses a combination of naturally occurring Probiotic microbes, certain non-toxic ingredients and a **proprietary fermentation & formulation** process to produce the final products

Unique Technology

- Formulation is a consortium of biochemicals
- **It is not an enzyme**
- Can be stored at ambient temperature
- Shelf life of one year
- No change required in process conditions
- Can be applied at a broad range of pH & temperature

Technology for Pulp and Paper

Probiotics in paper are the first of its kind product range for application in processing of Recycle and Virgin Pulp to enhance bleaching / delignification.

- Bleach Enhancers
  - Delignification & Bleaching Enhancer – Various Stages of Pulp Bleaching
  - Bleaching Booster for Oxidative Bleaching
  - Bleaching Enhancer For Reductive Bleaching

- Other Products
  - Yield Enhancer – Cooking Stage
  - Odour Controller for Pulp Mills – Cooking Stage

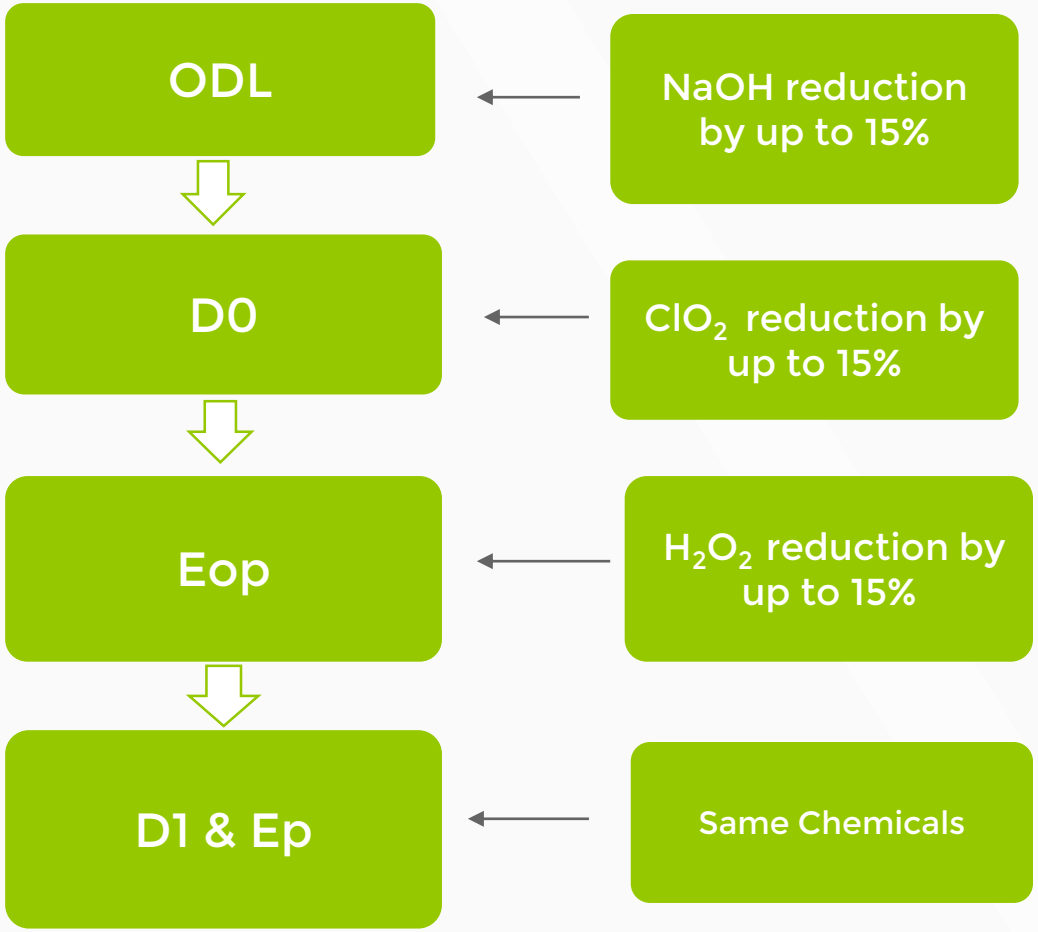
- In the pipeline – Deinking Surfactant, Stickies Control, Slimecide and many more

1.Delignification & Bleaching Booster

A powerful metal chelator with a surfactant property to enhance delignification and bleaching

- ✓ Reduces chemical usage thus enhances profitability
- ✓ Better brightness & whiteness
- ✓ Improves paper quality such as tear/ burst strength
- ✓ Single product at multiple stages of bleaching
- ✓ Reduces effluent load

Application in Delignification & Bleaching



Improved Whiteness/ Brightness (about 1%) Better Viscosity/ Mechanical Properties

Reduced load on Effluent especially AOX

2.Bleaching Aid For Recycle Paper & Mechanical Pulp

Formulation with powerful metal chelating property that inhibits transition metal ions from degrading oxidative bleaching chemicals used in DI stage.

- ✓ Reduces dosage of H_2O_2 by up to 40% thus enhances profitability
- ✓ Enhances de-inking
- ✓ Reduces scaling
- ✓ Suitable for all type of bleaching chemicals and furnish

Case Study in a Reputed Mill in South

Observations:

- R-420 Brightness values are maintained with reduced H_2O_2 levels.
- High Residual H_2O_2 levels indicates:
  - Enhanced reactivity of Peroxide
  - Scope for reduced H_2O_2 consumption

Case study:

At 250 grams per ton of Probiotic bleach enhancer in 1: 3 dilution with water and added before the addition of NaOH & H_2O_2.

Furnish %		H_2O_2 consumption		Probiotic Bleach Enhancer Dosage In Kg/ MT	Brightness			Residual Peroxide Kg/Ton
SOP	Indigenous Waste	Blank	With Probiotic Bleach Enhancer		Floation2 outlet	Bleach Tower Outlet	Brightness Gain	
50	50	24-26	14	0.25	60-61	69-70	9	0.2 – 0.25
60	40	23-25	13	0.24	61-62	69-71	9 -10	0.22-0.25
70	30	22-25	12	0.24	61-63	70-72	9-11	0.22 – 0.30

Case Studies : page - 2

- Recycle Writing Paper in West India- H_2O_2 by 25% & NaOH by 50%
- Recycle Newsprint in West India- H_2O_2 by 30% & NaOH/ Silicate by 15%
- Recycle Writing Paper in South India- H_2O_2 by 30% & Stabiliser by 25%
- Recycle Newsprint in North India- H_2O_2 by 25%
- Recycle Writing Paper in North India- H_2O_2 by 30% & replaced EDTA

3.Bleaching Enhancer For Reductive Bleaching

- ✓ **The product** is a powerful anti-oxidant with high metal chelating property. It inhibits iron from impairing the function of Hydro's, the anti-oxidants enhance the reduction efficiency.
- ✓ **Reduces Bleaching Chemicals**: Helps reduce dosage of Hydrosulphite by 30 to 40 % while maintaining the brightness.
- ✓ **Reduces Pollution Load**: Lower dosage of bleaching chemicals aids in reduction of effluent parameters such as BOD, COD
- ✓ **Reduces scaling and corrosion**

4.Pulp Yield Enhancer

First of its kind Cooking Aid that is readily bio-degradable and non-toxic.

- ✓ Not Anthraquinone based
- ✓ Reduces Kappa number
- ✓ Reduces Active Alkali dosage
- ✓ Increases Pulp Yield

5.Odour Controller

The first of its kind formulation developed specifically for the paper industry to control / eliminate odour from the cooking operation by neutralising mercaptans, sulphides and thereby enhance significantly the environment and hygiene in and around a pulp mill

- ✓ ODOUR CONTROL: Reduces Mercaptan gases. It cuts down odour generated at cooking stage drastically
- ✓ HEALTH: Health hazards posed by exposure to mercaptans / sulphides are cut down as emission of these malodorous gases is reduced by 60 %,
- ✓ COSTS: can reduce/ replace the Cooking Aid as it has all the properties of a Cooking Aid and further

Key Benefits

- First of its kind technology/ products for application in pulp & paper processing
- Applied at cooking, Delignification and Bleaching stages
- Can be used in Virgin grades (Wood, Non wood & Agriculture) and Recycled pulp mills
- Enhances Yield, Whiteness and Brightness
- Saves costs due to reduced use of chemicals
- Improves mechanical properties such as viscosity which in turn helps increase in ash content/ reduces the need for addition of long fiber
- Reduces effluent load
- COD, AOX, SAR, TDS seen to be lower

Thank you