FLOTATION CLARIFICATION OF MILL JUICE LOOKS PROMISING

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- Flotation has been successfully used for the purification of water, wine, fruit juice, cane syrup and melt.
- The Andhra Sugars Ltd of Southern India has for more than four decades used 2 bagasse diffusers at one of their plants and a cane diffuser at each of their other 2 plants.
- While juice from the cane diffusers is with suspended solids below 100 ppm, juice from the bagasse diffusers contains a few thousand ppm of suspended solids, as 60% of the juice is extracted by the primary mill.

- In an attempt to bring the suspended solids from the bagasse diffuser closer to that in juice from the cane diffusers, trials were undertaken with vibro screens, a self cleaning filter and a pusher centrifuge.

- The literature shows that in the wine and fruit **juice** industries flotation with air results in the oxidation of phenolics.

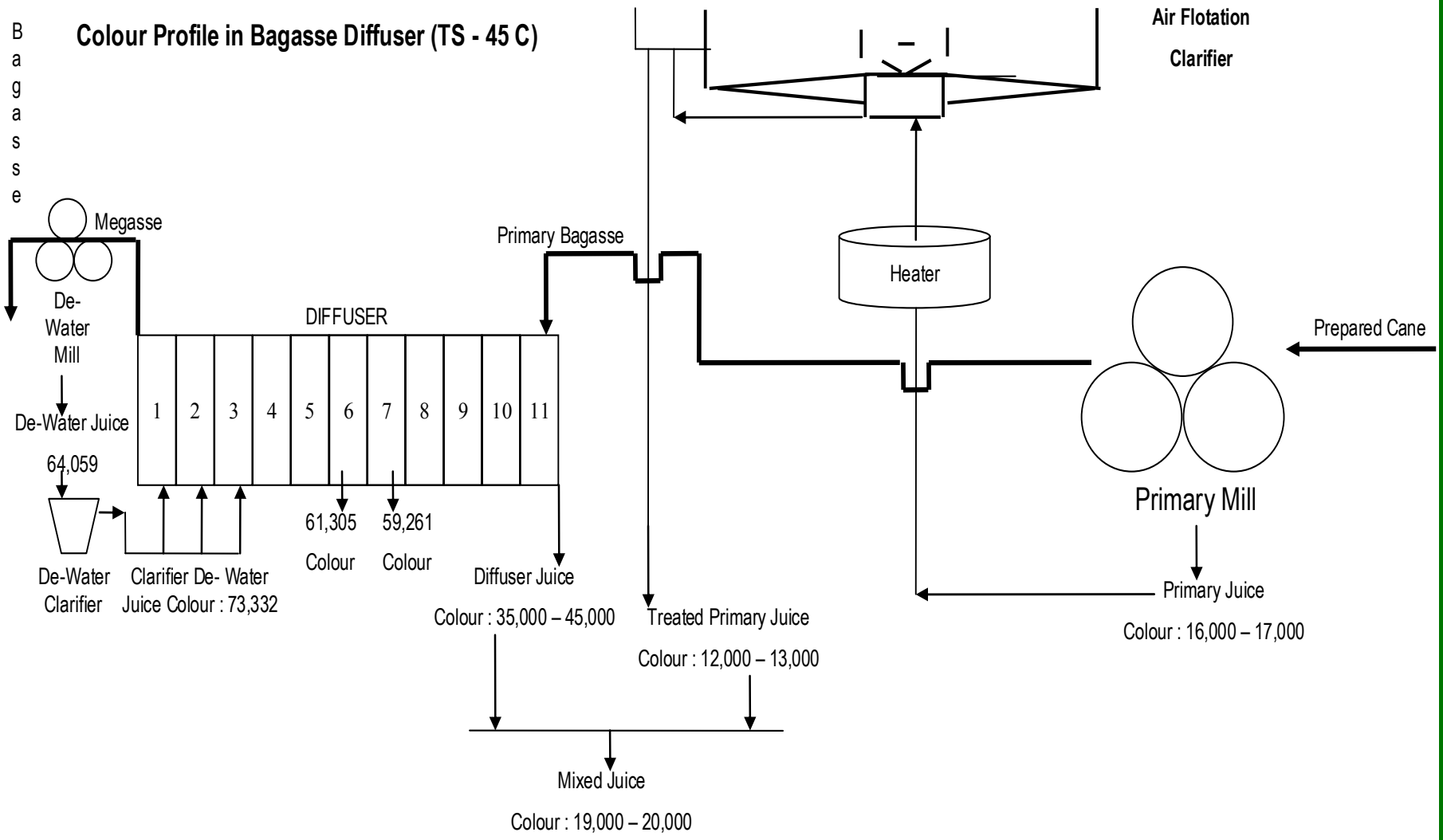
- Other reactions follow and the phenolic compounds are precipitated. They are then removed in the scum.

- This removal could result in a reduction of colour in the clarified juice.

- During the 2010–2011 season a trial was undertaken to put the primary mill juice through a flotation clarifier, using just air and just CO_2 (no other chemicals).

- Analysis of the juice in and out of the flotation clarifier showed a reduction in turbidity, but also a consistent colour **removal.**

Diagram Of Process





Juice Flotation Clarification – Top View



Overflowing Scum

Analytical methods

Colour : ICUMSA $_{420}$ Method

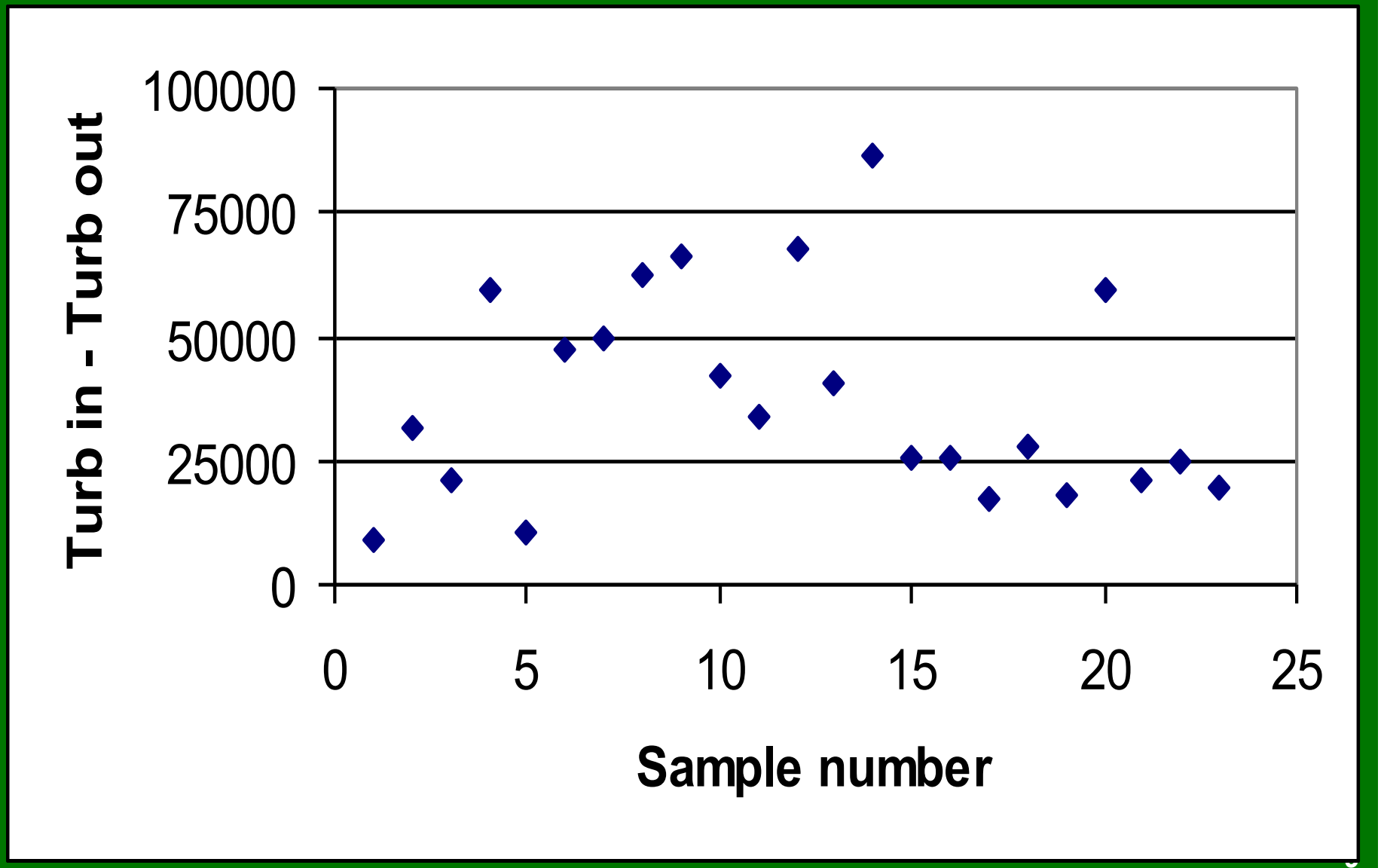
Turbidity : (Absorbency of unfiltered sample at 420 nm x 1000 – ICUMSA colour)

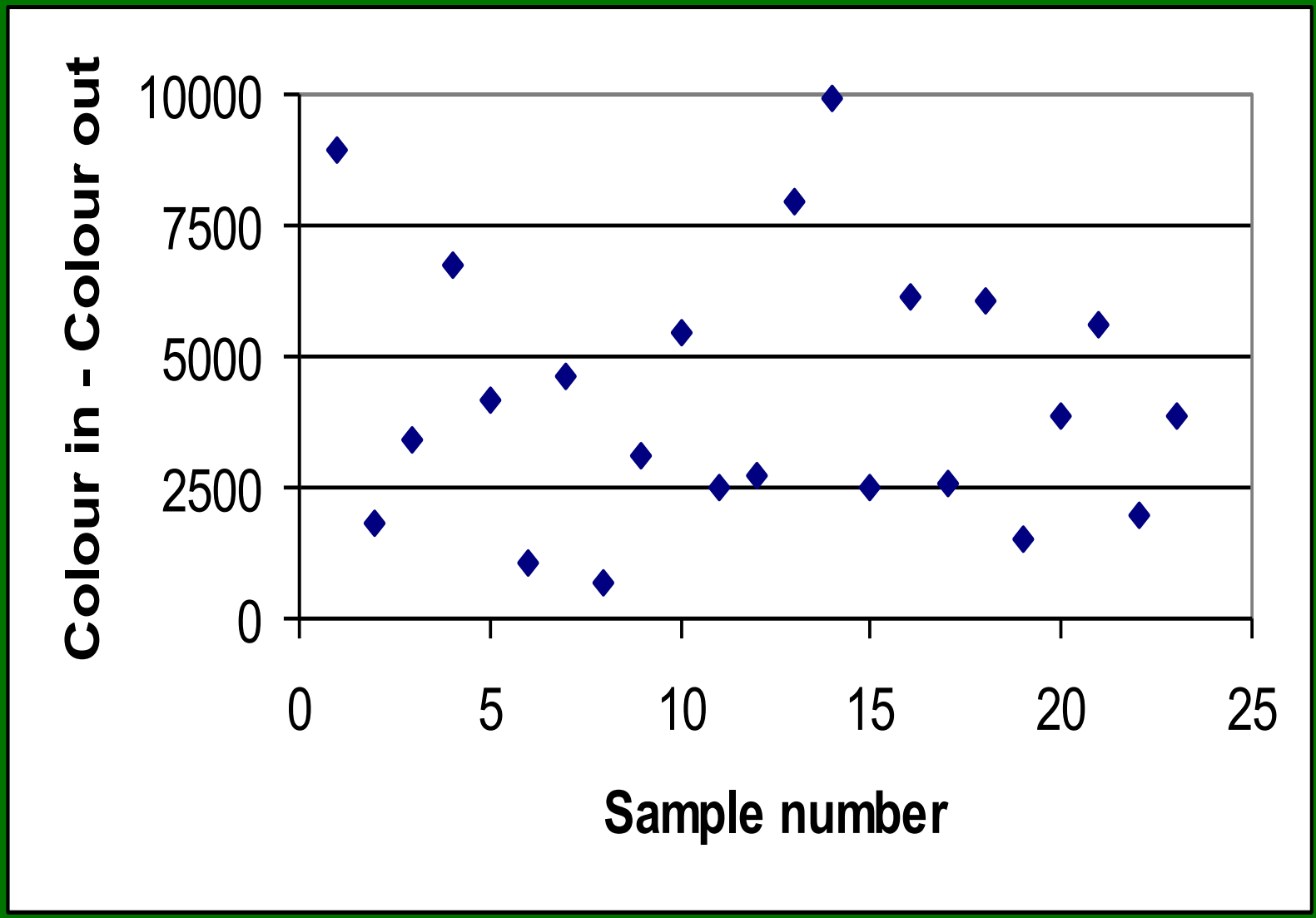
Polyphenols : Spectrophotometric method

Results: Colour and Turbidity

- 25 samples of feed to and of outlet from the clarifier were analysed over the period 15th December 2010 to 31st January 2011.
- Turbidity was reduced, on average by 34%.
- So was colour, on average by 25%.

Performance Of Primary Juice Flotation Clarifier




Colour in - Colour out
10000
7500
5000
2500
0
0
5
10
15
20
25
Sample number

Phenolics

- Indicator values* (IV) were measured at the end of the investigation. Averaged values were 8 for feed and for clarified juice, indicating no measurable change.
- An IV value of 8 indicates that colour bodies of plant origin are present. This is expected in primary mill juice.

*IV=(Absorbance at pH 9) / (Absorbance at pH 4).
Wavelength = 420nm.

- The concentration of phenolics was determined in three sets of samples.
- A 20% removal was found (1330 to 1070ppm).
- The number of samples analysed is obviously very small.



Inlet & Outlet Juice – Diluted to 10%

Conclusion

With no recurring expenditure other than for electricity to operate the flotation clarifier, this process could be beneficial to the cane sugar industry; it is worth pursuing.


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