LIFESPAN TECHNOLOGIES

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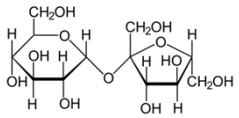
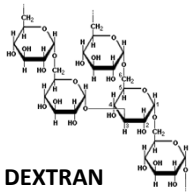
A SHORT ARTICLE ABOUT DEXTRAN AND ITS EFFECTS ON THE SUGAR INDUSTRY

Dextran is a complex, branched glucan polysaccharide made of many glucose molecules composed of chains of varying lengths. The straight chain consists of α-1,6 glycosidiclinkages between glucose molecules, while branches begin from α-1,4 linkages (and in some cases, α-1,2 and α-1,3 linkages as well).

Dextran is synthesized from sucrose by certain lactic-acid bacteria, the best-known being **Leuconostoc mesenteroides** and Streptococcus mutans.



SUCROSE



DEXTRAN

THE FIELD

Most dextran is built up **after harvest** due to a variety of avoidable reasons:

- Long waiting time between harvest and crushing in the mill
- Wet and hot climate conditions
- Exposure to dirt and mud
- Burning of cane fields notably aggravates the phenomenon
- Billeted cane is more affected than wholestick cane

Long transportation time between field and factory aggravates the problem…

THE MILL/FACTORY

Effects of dextran on factory performance :
sugar recovery

- direct loss due to metabolization (<1%)
- loss due to dextran mediated juice impurity
- loss due to reduced growth of crystals

clarification, filtration & throughput

- suspended matter may be carried over to juice due to dextran's function as protective colloid

raw sugar quality

- false increased polarization readings due to dextran
- reduced filterability of raw sugar
- buildup of dextran in raw sugar causes carry over to the refinery

The graph on the right illustrates the loss of overall sugar recovery as a function of dextran contamination (from Ravno&Purchase 2005)

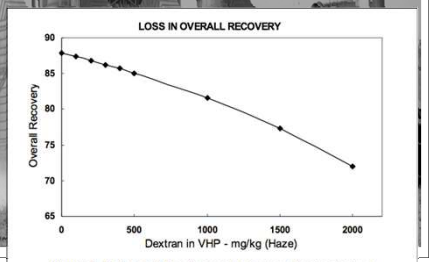


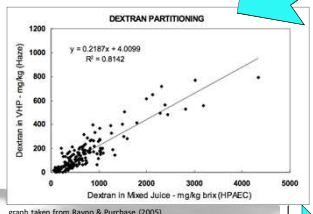
Figure 9. Estimated loss in sugar recovery due to dextran.

graph taken from Ravno & Purchase (2005)

THE REFINERY

Since dextran accumulates in raw sugar to a huge extent (see graph) the problems described are carried on to the refinery

Drying of sugar is slowed by increased levels of dextran.
The stickiness of moist sugar makes it more challenging to package



graph taken from Ravno & Purchase (2005)

THE F&B INDUSTRY

Dextran contamination in incoming sugar causes a variety of problems for the sugar processing industry:

- flocking in alcoholic and acidic beverages
- distortion of hard candy

As a result, sugar purchasers are increasingly demanding low dextran thresholds

THE CONCLUSION

- Dextran causes severe economic damage along the entire value chain of production and processing
- The basis for all prevention strategies is to assess the level of contamination at all links of the chain
- Countermeasures to prevent dextran contamination are available