

# INFECTION CONTROL USING NATURAL HOP BETA ACIDS, A FOCUS ON THICK JUICE STORAGE

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## ABSTRACT

Bacterial infection during the production of sugar is a significant issue. Bacteria consume sugar leading to loss of yield and quality. Hop Beta Acids (HBA) have been used for over 15 years as an antibacterial agent controlling infections in all diffuser types. In recent years interest has turned to the stabilisation of thick juice. Producers are storing juice for longer periods especially if used as a feed stock in ethanol production as is the case in Europe. Several pilot studies have been carried out to look at the possibility of using HBA as a preserving agent in thick juice.

There have been several papers over recent years exploring thick juice degradation. Sargent et al (*Sugar Industry* 122 (1997) 615-621) highlights that even during good storage practice thick juice can still randomly degrade with a fall in pH as the main indicator. Justé et al (*Food Microbiology* 25 (2008) p413-421 and 831-836) concludes that “fastidious bacteria” are the main bacteria present during degradation and identifies the species as *Tetragenococcus Halophilus*. There have also been two pilot studies looking at the protective effects of HBA. Justé et al (*J. of Applied Microbiology* 104 (2008) 51-9) conclude “Beta acids do not prevent thick juice deterioration but significantly delays its degradation”. They show HBA is effective against *T. Halophilus*, it is stable in thick juice for long time periods and show they degradation times increased from 34 days in the control to 272 days in juice treated with 40ppm HBA. Hein et al (*Sugar Industry* 127 (2002) 243-257) explore treatment of juice with a low level of HBA (3ppm) and a surface treatment with 10% NaOH. Again results show an increase in the stability of the juice, extending the time before degradation.

In recent years there have been some positive full scale industrial applications of HBA. In doing so there are some practical considerations on how to dose the product. HBA is sold commercially as a 10% solution in water, as such its density is much lower than the high Brix juice. Therefore in order to ensure good mixing the product should be added continuously on filling the storage tanks. Two effective applications are highlighted, one in Europe and one in the US. In the European trial the pH is observed to be more stable than untreated juice, *T. Halophilus* numbers are seen to be reduced or even not detected. In both cases there are no observed issues with processing the treated juice or any further quality issues.

In general thick juice storage, if carried out with in good conditions, is without degradation issues. There can be random ‘bad tanks’ but it would be down to the producer to decide if it is worth using a precautionary treatment such as HBA. However if there is a history of poor stability or there are processing issues expected to produce poor quality juice then treatment with HBA could be a consideration.