Introduction

Molasses desugarization by ion-exclusion and chromatographic separation is a process for extracting sugar from molasses.

Another method is betaine separation from beet molasses, using chromatographic separation and having at least three chromatographic columns connected in series. Betaine is used in the pharmaceutical, cosmetic, feed, food and chemical industries.

Diluted molasses is supplied to a chromatographic water feed column. Different fractions leave the bottom of the column. First is a non-sugar waste fraction, a second fraction contains a substantial proportion of the sugars in the feed and a third fraction of betaine, which is eluted at the tail end after the sugar fraction. The third fraction contains a high proportion of the betaine in the feed, as much as 80% or more, on dry substance. From this betaine fraction, betaine can be recovered by crystallization or may be recovered as hydrochloride, if desired. Use of these processes has enabled a 95% recovery of the sugar in molasses.

Application

Desugarization process

During the chromatographic separation, a wide spectrum of adsorption and exclusion of various ionic and non-ionic components takes place. These processes divide the feed into several fractions with different compositions (Figure 1).
The sugar fraction leaves the separation column at about 30 Brix. After that, it can be evaporated to higher concentrations for further use. The salts and non-sugar fraction with 4 to 8 Brix can be evaporated and used as animal feed.

**Instrumentation and installation**

The K-Patents Refractometer PR-43 provides in-line and real-time Brix measurement to improve the chromatographic separation and successfully recover betaine.

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<th>Instrumentation</th>
<th>Description</th>
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<td>K-Patents Sanitary Compact Refractometer PR-43-AC for hygienic installations in small pipe line sizes of 2.5 inch and smaller. The PR-43-AC refractometer is installed in the pipe bend. It is angle mounted on the outer corner of the pipe bend directly, or by a flow cell using a 3A Sanitary clamp, I-clamp or Varinline® connection.</td>
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| User Interface       | Selectable multichannel MI, compact CI or a web-based WI user interface options allow the user to select the most preferred way to access and use the refractometer measurement and diagnostics data. |

| Prism wash systems   | Prism wash system components are a refractometer with integral wash nozzle mounted at the refractometer probe or in a flow cell, wash supply line components and a Multi user interface MI with relay module for prism wash diagnostics and control. Alternative wash media can be used for wash, e.g. steam, water (or solvent) and high-pressure water. |

| Measurement range    | Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 Brix.                                                                                                                                      |