

Recovery of Sucrose from Molasses

(Extracted from the Diaion Manuals pages 263 to 264)

(3) Refining of Liquid sugar

Crystalline sugar is difficult to be dissolved in water. Liquid sugar is widely used in foodstuff factories instead of crystalline sugar. There are three kinds of liquid sugar:

1) Sucrose type Liquid sugar

This contains pure sucrose only, and thus the concentration is limited due to sucrose solubility at Brix 67. The refining with IERs after decolorization by Cl-form SBAER is the reverse method: the treatment with OH-form SBAERs, e.g. PAF308L, is performed in advance of the one with H-form CERs, e.g. WK10, to avoid from inversion loss of sucrose.

2) Invert liquid sugar

Sucrose solution is treated with H-form SACERs in warm conditions and then with free-base-form SBAERs in order to produce invert liquid sugar. Concentration can be increased at around Brix 75.

3) Mixed type Liquid sugar

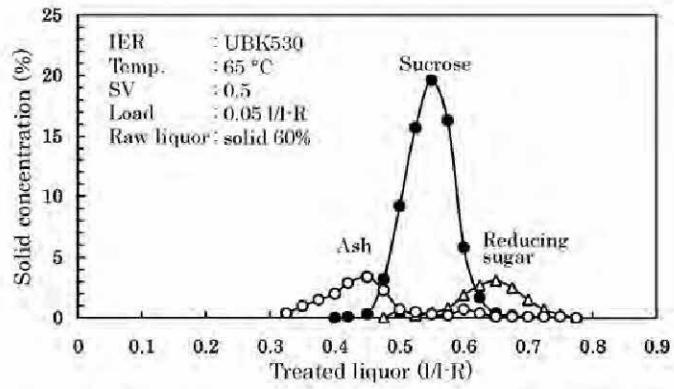
Mixtures of sucrose and glucose that have Brix of above 65: there are many kinds of compositions for various uses.

(4) Recovery of Sucrose from exhaust molasses

The exhaust molasses from which crystalline sucrose is not collected economically holds concentrated non-sugar materials, reducing sugar and salts, and thus are discharged or utilized as fodder or raw materials for fermentation. However, sucrose is traditionally collected by "Steffen" method from beet molasses since exhaust molasses contains $\geq 50\%$ sucrose. In recent years, ion exclusion chromatography with Na-form or K-form SACERs is applied to collect sucrose instead of "Steffen" method. Fig.VIII-1-9 illustrates such example and in this example reducing sugar, a monosaccharide, is also collected by the size exclusion effect as well as sucrose, a disaccharide.

The sucrose recovery process from cane molasses by ion exclusion chromatography was introduced in Okinawa in 1984, and the process was applied for beet molasses in 1989. In the latter case, since raffinose, a tri-saccharide, hinders the boiling of sucrose, it should be separated with salts by the size exclusion effect.

Simulated moving bed system is applied in all chromatographic separations, since single tower batch system is less effective.



[Fig.VIII-1-9] Recovery of Sucrose from sucrose liquor by ion-exclusion chromatography⁽⁶⁸⁾
(Single tower batch operation)