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### **Membrane-based no-waste extract decolorization process.**

Molasses desugarization using simulated moving bed chromatography has been widely adopted within the US beet sugar industry. Processing of the high-purity extract fraction from this operation can be integrated into the factory in a number of ways. However, since the extract is typically higher in both color and purity than thick juice, extract crystallization using the standard three-boiling scheme can be challenging. Adding the extract into the white boiling allows the extract to be more easily exhausted down to an acceptable final molasses purity through all three stages of crystallization but yields a higher product sugar color. Alternatively, adding the extract into the high raw boiling allows for more effective color elimination, but raises the purity of the final molasses due to the difficulty of exhausting such high purity material in only two crystallization stages. Ion exchange decolorization of the extract prior to crystallization is an attractive solution to this problem but would normally result in the generation of unacceptably large quantities of brine waste for disposal due to the high color loads involved. Recently, this problem was solved when Amalgamated Research developed and patented a “no-waste” decolorization process that uses membrane nano-filtration to recover inorganic salts from the separator raffinate stream and uses these to regenerate an ion exchange resin in extract decolorization service. After regeneration, the spent regenerant is recombined with the raffinate stream without affecting its value as a coproduct. Extensive pilot testing with materials from several facilities has demonstrated that high resin color loadings can be achieved, while providing extract decolorization of more than 70%. This promising technology offers the possibility of improving overall sugar-end performance by reducing sugar recycle, thereby increasing overall sucrose extraction.