

POSTER SUMMARY

**SUGAR CANE JUICE CONCENTRATION AND SEPARATION WITH
HYDRATE TECHNOLOGY**

DOUBRA P, NAIDOO P, NELSON W and RAMJUGERNATH D

*Thermodynamics Research Unit, University of KwaZulu-Natal, King George V Avenue,**Durban, Howard College Campus, South Africa, 4001.*parisa.dobra@gmail.com naidoop18@ukzn.ac.za nelsonw@ukzn.ac.za ramjuger@ukzn.ac.za**Abstract**

Various treatment methods, including evaporation, membrane and freezing separation technologies, are used to concentrate sugar cane juice. Evaporation is the traditional and most commonly used method, however, the juice is very sensitive to heat which can alter its colour and flavour. The use of membranes is a developing technology whereby juice can be concentrated up to 70 % (m/m) sucrose, however, capacity and downtime for cleaning and maintenance are some of the drawbacks. Freezing is another developing technology, applicable to sensitive materials, with reported concentrations of up to 20-40 % (m/m) solids. It, however, results in high energy costs and a lengthy processing time.

Gas hydrate separation is an emerging technology which concentrates fruit juice by trapping the moisture in water cages. The advantages, drawbacks and feasibility of the different separation methods of juice concentration have been investigated. In the processing of sugar cane to produce sugar crystals, the clarified juice is concentrated in a multi-effect evaporator train to 60 % (m/m) sucrose. Thomsen *et al.* (2009), Li *et al.* (2015) and Smith *et al.* (2016) investigated sucrose concentration using the gas hydrate based method.

For this study, new equipment has been designed in the Thermodynamics Research Unit (University of KwaZulu-Natal) to investigate the effect of juice concentration with sampling of the concentrate to analyse the final sucrose content. Kinetics studies, using a 750 ml gas hydrate reactor vessel, will also be performed.

Key words: juice concentration, hydrate technology, separation technology