POSTER SUMMARY

CAN NIRS DETECT QUARTERNARY AMMONIUM COMPOUNDS IN REFINED SUGAR?

WALFORD SN

[1] *Sugar Milling Research Institute NPC, c/o University of KwaZulu-Natal, Durban, 4041, South Africa, swalford@smri.org*

Abstract

Quaternary ammonium compounds (QAC) are commonly used in the industry as biocides and are present as the active groups of flocculants and colour removal additives. QACs are generally fully eliminated in the mill and refinery processes but confirmation of this is required by end-users of the product. The current method of analysis specified by bottling companies and used at the Sugar Milling Research Institute NPC (SMRI) is based on the development of a coloured complex with the QACs, extraction with ethylene chloride, and measurement using UV-Vis spectrophotometry. Disadvantages of the method include being exceptionally time consuming, requiring special cleaning of glassware, the analysis of an additional six standard samples for the determination of a standard curve with every batch of samples analysed (normally about ten samples), and the subsequent disposal of ethylene chloride.

The majority of samples analysed by the SMRI over the last five years have proved negative for QAC, raising the question of whether a rapid Near Infrared Spectroscopy (NIRS) method that could detect if any particular sample contained QAC, could be developed. Identification of QAC negative samples would eliminate the need for the analysis of these samples by the tedious extraction method requiring only QAC positive samples to be analysed and quantified. The direct advantage of this methodology would be faster turn-around time and more productive use of resources. The indirect advantage is reduction in ethylene chloride disposal costs.

This study investigated the potential of using NIRS to detect low concentrations of QAC in QAC positive refined sugar samples. The proposed simple identification method involves dissolution of the refined sugar in water and analysis by transmission NIRS. The method was checked by using real positive and negative samples and a spiked sugar was prepared for the extraction method validation studies. Results of the study will be presented in this poster.

Keywords: Quaternary ammonium compounds, QACs, NIRS