

Continuous Flow Experimental Set-Up for Fouling Deposit Study

ABSTRACT

The study of the fouling deposition of pink guava juice (PGJ) is relatively new research compared to milk fouling deposit. In this work, a new experimental set-up was developed to imitate the fouling formation in heat exchanger, namely a continuous flow experimental set-up heat exchanger. The new experimental set-up was operated under industrial pasteurization temperature of PGJ, which was at 93°C. While the flow rate and pasteurization period were based on the experimental capacity, which were 0.5 and 1 liter/min for the flow rate and the pasteurization period was set for 1 hour. Characterization of the fouling deposit was determined by using various methods. Microstructure of the deposits was carried out using ESEM. Proximate analyses were performed to determine the composition of moisture, fat, protein, fiber, ash and carbohydrate content. A study on the hardness and stickiness of the fouling deposit was done using a texture analyzer. The presence of seedstone in pink guava juice was also analyzed using a particle analyzer. The findings shown that seedstone from pink guava juice ranging from 168 to 200µm and carbohydrate was found to be a major composition (47.7% of fouling deposit consists of carbohydrate). Comparison between the hardness and stickiness of the deposits at two different flow rates showed that fouling deposits were harder and denser at higher flow rate. Findings from this work provide basis knowledge for further study on fouling and cleaning of PGJ.

Keyword: Pink guava juice, fouling deposit, heat exchanger