

Membrane-based clarification of banana juice: pre-treatment effect on the flux behaviour, fouling mechanism and juice quality attributes

ABSTRACT

The processing of banana into clarified juice provides an alternative in the beverages market, but further exploration of the related processing is required. Hence, this study investigated the pre-treatment effect during the membrane-based process on the flux behavior, fouling mechanism and banana juice quality attributes. Observation on juice viscosity was done after the crude banana juice was pre-treated with 0.1 – 0.5% pectinase. Both pectinase-treated and untreated banana juices were then subjected to an ultrafiltration process using a 100 kDa dead-end polyether sulfone membrane to clarify the juice. This study found a 50-55% viscosity reduction of the banana juice after the pre-treatment, with no significant difference in terms of the pectinase concentrations. Pre-treatment of the banana juice prior to ultrafiltration also have improved the permeate flux by 65.5% compared to the untreated sample. Based on the fitting of several fouling models, cake layer formation on the entire surface of the membrane was identified as the main cause of the membrane fouling and flux deterioration. The ultrafiltration process has significantly improved the juice turbidity, total soluble solid and colour, at a stable pH, indicating the success of the clarification process.