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Effects of electric field strength on characteristics of pineapple juice during ohmic heating

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Pineapple (*Ananas cosmosus*) juice is very popular for its pleasant aroma and flavor. Thermal processing is most commonly used to extend shelf life of fruit products like pineapple juice. Therefore, the aim of present study was to evaluate the effects of electric field strength (EFS) on various attributes of pineapple juice during ohmic heating (OH). The juice was heated to 80°C at 16 V/cm and held at 80°C for 1 min at various levels of EFS, followed by immediate cooling. The juice was also heated by the conventional or hot water (HW) method with same heating profile as that of OH. Fresh and thermally treated samples were analyzed for Poly-phenol oxidase (PPO) activity, Color, Total phenols (TP) and Hyrdoxymethylfurfural (HMF). The electrical conductivity changed linearly from 0.143 to 0.286 S/m when the temperature rises from 25 to 80°C. The PPO activity was reduced by 50% with HW treatment, and the reduction in PPO activity followed a logarithmic trend ($R^2=0.965$) with the EFS. The color parameters 'L' (dark to light) increased with HW and OH at 36 V/cm, where as it remained closer to fresh juice by OH at EFS of 16-32 V/cm treatments. The value of 'a' (green to red) decreased with EFS, however at 36 V/cm during OH the 'b' (blue to yellow) showed a sharp increase. Ohmic treatment at 16-24 V/cm was found to retain higher amount of TP comparatively, on the other hand the EFS had a positive relationship with HMF formation. Therefore, it was found that EFS has a strong effect on PPO inactivation and HMF formation in pineapple juice. Also, the ohmic heating process can be developed to replace conventional thermal processing of pineapple juice with improved product quality.

Biography

Hilal Ahmad Makroo completed under graduation (B. Tech Food Technology) and post-graduation (M Tech Food Processing and Technology) in 2010 and 2013 respectively. After completion of his post-graduation in August 2013 he enrolled for PhD as a Maulana Azad National Fellow in the Department of Food Engineering & Technology, Tezpur University, India. My research interests include ohmic heating of food material, novel food processing methods and modeling & kinetics of enzyme and microbial activity during processing of food material. Presently he is a Commonwealth Scholar at the Department of Chemical and Process Engineering, University of Surrey UK, under the Commonwealth Split-site scholarship 2016-17.

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