

UV-C effect on microbial disinfection of pineapple-mango juice blend using Dean-vortex technology

ABSTRACT

This study intended to evaluate the effect of ultraviolet irradiation (UV-C) treatment of Dean-vortex technology on pineapple-mango juice blend microbial safety. Non-thermal alternative treatment of UV-C known to be promising in juice processing but low penetration depth in opaque liquid resulted in enhancement of treatment using dean vortex. Dean vortex promotes mixing in helically arranged treatment tube. Two pump frequency was selected (40 and 45Hz) to be performed on pineapple-mango juice blend at blending ratio of 70% pineapple and 30% mango. The flow regimes inside the polyfluoroalcoxy (PFA) tube behave as turbulence as the effect of dean vortex for both flow rates of the pump which brought the targeted microorganism closer towards light source relatively improve treatment efficiency. Pathogenic *E. coli* O157: H7 that can cause fatality was inoculated into pineapple-mango juice blends. This study shows that at a UV-C dosage of 8.38mJ/cm² able to reduce *E. coli* O157: H7 more than 5 log reduction. Although UV-C treatment unable to fully disinfect yeast and mould counts in pineapple-mango juice blend, the detection colony was still under the permissible limit (1.26 log CFU/mL). These proved that UV-C treatment with the implementation of dean-vortex technology able to meet the microbial load safety limit comparable to commercialize practice using thermal pasteurization.

Keyword: UV-C; Pineapple; Mango; Juice blend; Dean-vortex