

Effect of repetitive ultraviolet irradiation on the physico-chemical properties and microbial stability of pineapple juice

ABSTRACT

The study aims to investigate the effect of repetitive ultraviolet irradiation (UV δ UV) and the combination effect with dimethyl dicarbonate (UV δ DMDC δ UV) on the physico-chemical properties and microbiological stability of pineapple juice. UV dosages of 10.76 mJ/cm² per cycle and 250 ppm of DMDC were used. There was a significant decrease in turbidity, total phenolic and vitamin C in the treated juices. The UV δ UV reported a significant reduction of 1.91 log CFU/ml in total plate count and 1.4 log CFU/ml in yeast and mould. Post addition of DMDC into the UV irradiated juice (UV δ UV δ DMDC) showed reductions of 2.61 log CFU/ml for TPC and 4.87 log CFU/ml for YM. This study demonstrated the effectiveness of UV irradiation in preserving the nutritional quality and the addition of DMDC can have a combination effect with the UV irradiation of juice in terms of microbial reduction. However, the treatments were not sufficient to achieve adequate microbial reduction as required by the FDA.

Industrial relevance: Dimethyl dicarbonate (DMDC) is one of the effective anti-microbial agents that can control a wide range of microorganisms which includes *Escherichia coli* 0157:H7 and yeast. The effect of dimethyl dicarbonate (DMDC) in reducing microbial counts was significant in this study. According to Threlfall and Morris (2002), DMDC is used to prevent fermentation in excessive yeast contamination in wine production. Moreover, Halim et al. (2012) stated that DMDC has shown promising results for microbial inactivation of fruit juices in a preliminary study in lab. Therefore, combination effect with additives (DMDC) may be able to increase the efficiency of the UV irradiation for microbial reduction in juice and longer the shelf life of juice.

Keyword: Ultraviolet irradiation; Juice; Dimethyl dicarbonate