SENSORY AND MICROBIOLOGICAL QUALITY OF ROMAINE LETTUCE AND KALE AFFECTED BY THE COMBINED TREATMENT OF AQUEOUS CHLORINE DIOXIDE AND ULTRAVIOLET-C

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Minimally processed vegetables can be a vehicle for the transmission of pathogenic bacteria causing human illnesses. Thus, appropriate decontamination treatment is needed to improve the microbial safety. Various processing methods such as aqueous chlorine dioxide (ClO₂) treatment or ultraviolet-C (UV-C) irradiation have been used to reduce the bacterial counts. Recently, hurdle technology has been introduced. Therefore, the objective of this study was to improve the sensory and microbiological quality of Romaine lettuce and kale by the combined treatment of aqueous ClO₂ and UV-C as a hurdle technology. Romaine lettuce and kale samples were inoculated with Escherichia coli O157:H7 and Salmonella enterica serotype Typhimurium. The inoculated Romaine lettuce and kale as well as fresh samples were treated with 50 ppm aqueous ClO₂, 10 kJ·m⁻² UV-C, and the combination of aqueous ClO₂ and UV-C, and stored at 4°C for 7 d. The combined treatment reduced the initial populations of total aerobic bacteria in the lettuce and kale by 2.07 and 2.49 log CFU/g, respectively, compared to the control. The populations of yeast and mold were also reduced by 1.85 and 4.25 log CFU/g, respectively. E. coli O157:H7 and S. Typhimurium inoculated in the lettuce and kale were eliminated by the combined treatment. Sensory evaluation results indicated that the combined treatment provided better sensory scores than did the control. Our results suggest that the combined treatment of 50 ppm aqueous ClO₂ with 10 kJ·m⁻² UV-C can be useful for maintaining the microbial safety and sensory quality of Romaine lettuce and kale.