

Sonolytic-ozonation technology for sanitizing microbial contaminants and pesticide residues from spinach (*Spinacia oleracea* L.) leaves, at household level

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Abstract

Increasing foodborne illnesses linked with the consumption of contaminated food pose serious health risks. Fresh fruits and vegetables can potentially be contaminated (microbes/chemicals) throughout the supply chain. Various chemical and thermal approaches have been used in the past to decontaminate fresh produce, which have had a negative impact on commodities and health hazardous. Henceforth, this conducted study was aim to test an ecofriendly/green decontamination technique, for impact on food safety and quality of spinach. Freshly harvested spinach leaves were treated with a combined application of ozone and ultrasound (O_3+US) for different times (5, 10, and 15 min) in an aqueous medium. Different food safety (microbes and pesticide residues) and quality (VC content, TSS, TA, and weight loss) parameters were studied in comparison with tap washed samples. Total plate count method was used to evaluate microbial contamination and pesticide residues were determined by HPLC. There was gradual decrease in contaminants with increase in O_3+US treatment time. Sonolytic-ozonation 10 and 15 min treatments were found optimal in reduction of microbial counts (TPC, *E. coli*, *Salmonella*, and *Listeria*) and pesticide residues (10 min 94.04% and 15 min 99.77% residue reduction). However, chlorophyll degradation was observed in 15 min treated sample under 1-week household storage. There was no significant detrimental impact on quality parameters of spinach during 1 week of storage under refrigerated conditions. So, it was concluded that O_3+US treatment for 10 min can be employed for microbial and chemical decontamination in spinach leaves at household level without any negative effect on its quality up to 1 week under refrigerator storage (5 ± 2 °C).