

**EFFECT OF STEAM STERILIZATION ON PHYSICO-
CHEMICAL AND MICROBIAL PROPERTIES OF BLACK
PEPPER (*Piper nigrum* L.)**

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ABSTRACT

Production of high quality black pepper is a major requirement to comply with food safety standards of spice importing countries. A major problem in the pepper exporting industry in Sri Lanka is the higher percentages of microbial contaminations. Thus, this study was conducted to investigate the use of steam sterilization technique for reducing microbial load in black pepper and to evaluate its effect on chemical quality of black pepper. Black pepper was exposed to steam generated at two different temperature levels (100 °C and 121 °C) and at five different exposure times (2, 4, 6, 8 and 10 minutes). Microbial, chemical and physical properties were tested after the sterilization. Completely Randomized Design (CRD) and two factor factorial design were used to analyse data. Tukey pairwise comparison was used for mean separation at 0.05 significance level. Initial microbial load was 7.9×10^7 CFU g⁻¹. The final colony count of pepper samples that were exposed to 100 °C steam for 8 and 10 minutes and 121°C steam for 6, 8 and 10 minutes were found to be significantly different from the control. They showed a reduction of microbes ranging from 3.2×10^2 to 2.5×10^3 CFU g⁻¹. Changes in volatile oil and oleoresin content were not significant among all treatments. Absorption of moisture to pepper increased gradually and significantly with time. The highest browning index was given by sterilization at 121°C for 8 minutes ($P < 0.05$). According to the results, steam sterilization at 100°C and 121°C for 10 minutes can be effectively used to reduce microbial load of collected market samples to the acceptable level of 10^4 CFU g⁻¹.

Key Words: Black pepper, microbial load, product quality, steam sterilization, volatile oil