

# A comparative Study on microbial and Sensory Quality of Sri Lankan Green Tea Produced by Different Manufacturing Methods

M.P.G.R.C. Maduhansi<sup>1\*</sup>, K.P.G.K. Thushara Guruge<sup>2</sup>, K.P.M. Kahandage<sup>3</sup>

<sup>1</sup>Department of Export Agriculture, Faculty of Animal Science and Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka

<sup>2</sup>Analytical Service, Sri Lanka Tea Board, Colombo, Sri Lanka

<sup>3</sup>Department of Food Science and Technology, Faculty of Animal Science and Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka

*Chalanimaduhansi490@gmail.com*

Despite the global reputation, Sri Lankan green tea faces challenges in complying with established microbiological standards. With increasing international demand, microbial and sensory parameters are critical for regulatory acceptance and market competitiveness. This study evaluated the microbiological and sensory quality of Sri Lankan green tea produced using three manufacturing methods practiced locally: steaming, panning, and handcrafting and examined their compliance with Sri Lanka Tea Board microbiological standards. Green tea samples were collected from all operational green tea factories (n=15) during 2025, with three replicate samples per factory. Microbiological analyses were performed in accordance with ISO 11287:2011 standard at the microbiological laboratory, Sri Lanka Tea Board. Each sample was analyzed in triplicate for Total Plate Count (ISO 4833-1:2013), Yeast & Mold (ISO 21527-2:2008), Total Coliforms (ISO 4831:2006) and *Escherichia coli* (ISO 7251:2005). Sensory evaluation was performed by seven trained tea tasters, assessing dry leaf appearance, liquor quality, and infused leaf characteristics. Statistical comparisons among manufacturing methods were carried out using MINITAB 15. Handcrafted green tea showed the lowest microbial loads, with approximate mean counts for yeast and mold (602 CFU/g $\pm$ 87), total plate count (339 CFU/g for  $\pm$ 123), and coliforms (435 CFU/g $\pm$ 225). In contrast, panning method reported the highest microbial loads, yeast and mold counts (4.21 $\times$ 10<sup>5</sup> CFU/g), total plate counts (8.15 $\times$ 10<sup>5</sup> CFU/g), whereas steaming had moderate levels, yeast and mold counts (1.20 $\times$ 10<sup>5</sup> CFU/g) and total plate counts (5.45 $\times$ 10<sup>5</sup> CFU/g). Although all green tea samples were free from *Escherichia coli*, a substantial proportion failed to comply with the stricter microbiological safety limits of Sri Lanka Tea Board Circular ALMQS-02/2021; however, samples complied with the Tea & Herbal Infusions Europe (THIE) recommended microbiological limits for *Camellia sinensis* with minor deviations observed for yeast and mold. Overall, handcrafted green tea demonstrated a higher microbial safety with enhanced sensory quality, of Sri Lankan green tea.

Keywords: Green Tea; Manufacturing Methods; Microbial Quality; Sensory Quality; Sri Lanka