#2131: QUALITY ASSESSMENT AND ANTI-LISTERIAL EFFICACY OF COLD PLASMA TREATMENT ON FRESH LETTUCE

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Ensuring microbial safety of fresh leafy vegetables while preserving quality remains a major challenge for the food industry, driving interest in non-thermal decontamination technologies. This study evaluates the potential of cold plasma as an alternative to heat-based processing for the decontamination of lettuce. Although thermal treatments are not conventionally applied to this product due to their detrimental effects on freshness, they were included here as a reference for antimicrobial efficacy. Lettuce leaves inoculated with **Listeria innocua** (surrogate for **L. monocytogenes**) were treated using gliding arc cold plasma for 5--30 s and compared with hot water blanching at 80 °C for equivalent durations. Treatment effects were evaluated through microbial reduction and quality parameters, including color (total color difference, chroma, browning index), pH, chlorophylls (a, b, total), and total phenolic content. Thermal treatment achieved complete **L. innocua** inactivation (~7-log reduction) within 5 s, whereas cold plasma resulted in a slower decline, reaching approximately 2-log reduction after 30 s. pH remained relatively stable (5.6--6.0) across treatments. Cold plasma better preserved color vividness, chlorophyll b, total chlorophyll, and phenolic content, maintaining phenolic levels at approximately 14--15 mg GAE/g (fresh weight), while thermal treatment caused significant reductions even from short exposure times. Although thermal processing ensured rapid decontamination, cold plasma demonstrated superior preservation of physicochemical quality, highlighting its potential as a non-thermal strategy for lettuce with low microbial loads, provided its antimicrobial efficacy can be further optimized.