

TAL 797 – Seminário

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Effect of Cold Plasma on Microbial reduction and Physiochemical characterization in Orange Juice

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Traditional food preservation methods like pasteurization and sterilization rely on high heat to kill harmful microorganisms and extend shelf life. While these techniques are effective, the use of heat can reduce the food's nutritional value, change its texture, and affect taste. As consumer preferences shift toward fresher, more natural products without chemical preservatives, the food industry is exploring non-thermal technologies that can ensure safety while maintaining food quality. One of the most promising of these is cold plasma, a technique that uses electricity to energize gases, creating reactive particles that sanitize food without the need for high temperatures.

Cold plasma works by generating a mix of reactive oxygen species (ROS), reactive nitrogen species (RNS), charged particles, and UV photons. These agents are highly effective at microbial reduction. ROS and RNS can break down the DNA, proteins, and membranes of bacteria, while UV photons damage genetic material, stopping microbes from replicating. Charged particles disrupt the microbial cell membrane, especially because bacterial surfaces tend to be negatively charged, attracting positively charged plasma particles. This multi-level attack leads to a significant reduction in microbial load. Cold plasma is particularly effective on the surfaces of solid foods, where contamination is most likely, and in liquid foods, it can disinfect more thoroughly due to better mixing. In addition to being fast and operating at room temperature, cold plasma is environmentally friendly, using less energy and water, making it an efficient and sustainable solution for modern food safety and preservation (Xu *et al.*, 2017; Birania *et al.*, 2022; Ott *et al.*, 2022).

Referências bibliográficas:

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Xu, L. *et al.* (2017) 'Microbial Inactivation and Quality Changes in Orange Juice Treated by High Voltage Atmospheric Cold Plasma', *Food and Bioprocess Technology*, 10(10), pp. 1778–1791. Available at: <https://doi.org/10.1007/s11947-017-1947-7>.


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