

TAL 797 – Seminário

13/11/2024

ULTRASOUND IN THE FOOD INDUSTRY: ENHANCING ENZYMATIC PERFORMANCE

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Ultrasound (US) technology is recognized non-toxic, non-polluting, energy-efficient, and easy to install, with low installation and maintenance costs compared to other green technologies. This technology has been widely explored in the food industry, particularly in the extraction of valuable compounds. In research, US is increasingly investigated across various food-related areas, with growing interest in enzymatic hydrolysis processes. Enzymatic hydrolysis is crucial to producing peptides, sugars, and other functional ingredients. However, this process faces challenges such as low conversion rates and prolonged reaction times. In this context, US offers a promising alternative for enhancing enzymatic performance. By inducing cavitation in the medium, US generates microbubbles that collapse, creating shear forces, turbulence, and impacts that can directly affect enzyme structures. Under optimized conditions, this effect can lead to enzyme activation. Additionally, the cavitation phenomenon favors the transfer of energy and mass, accelerating US-assisted enzymatic reactions. US can also alter the structure of biomolecules, increasing the reaction surface area and improving enzyme accessibility to the substrate. However, modifying the structure of enzymes also presents challenges, including partial or total denaturation, which can impair catalytic activity, depending on the intensity and duration of the treatment. Therefore, rigorous control of process parameters, such as power, frequency, temperature, and exposure time, is essential to avoid adverse effects on enzymes and substrates. In conclusion, while US has demonstrated potential in optimizing enzymatic hydrolysis, its application in the food industry requires careful adjustment to identify optimal conditions for higher yield and quality in the final products.

References:

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