

Título: THERMAL RESISTANCE OF *BACILLUS ATROPHAEUS* SPORES CULTIVATED IN ORANGE RESIDUES MEDIA

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Resumo:

Agriculture has a significant importance on Brazil's economy, highlighting the production of fruits. Regarding oranges' juice manufacturing, this industrial process generates large amount of residue waste (50% of fruit weight), which is rich of nutrients that could be used as substrate for microorganism cultivation. Spores of *Bacillus atrophaeus* ATCC 9372 are known as to be a resistant form of bacteria and are used as biological indicators to monitor and to validate sterilization cycles ensuring the sterility of items and as producers of enzymes of industrial interest. This work aims to evaluate the potential use of orange bagasse as an alternative media to obtain *B. atrophaeus* spores to be used as bioindicators for sterilization processes. Surface oranges were rubbed, rinsed with tap water and immersed in a 1% peracetic acid solution for 60 minutes. The fruit was processed in a juice centrifuge to separate the bagasse (pulp, peel and seeds), which was frozen at -18°C, from the juice. Each cultivation media was prepared using 1.0 g, 2.5 g, 5.0 g, 10.0 g and 20.0 g of orange's bagasse into 100 mL of water, sterilized, filtered through gauze, inoculated with 0.1 g/L of *B. atrophaeus* ATCC 9372 spores and incubated in orbital shaker at 150 rpm / 37°C for 3 and 6 days. An aliquot of 10 mL was withdrawn and centrifuged at 4000 rpm / 4°C / 25 minutes, separating the pellet from the supernatant. The pH media, spores viability and thermal resistance, expressed in terms of D-values at 102°C were determined. After 6 days of cultivation using 5.0g of orange bagasse, viable spores achieved 6.30×10^8 CFU/mL, pH 9.13 (± 0.01), and similar behavior observed into TSB with 5.95×10^8 UFC/mL of cells, corresponding to 1.82×10^7 spores/mL, (pH 8.97 (± 0.01)). The spores developed showed appropriate thermal resistance being D-values at 102°C: (i) 1.41 minutes and 2.16 minutes for 1.0 g of bagasse and (ii) 1.61 minutes and 1.72 minutes for 5.0 g of bagasse after 3 and 6 days of cultivation, respectively. The viability and thermal resistance of *Bacillus* spores suggest that the use of orange bagasse corresponds to a small cost media to obtain *B. atrophaeus* spores which could be applied in industrial and pharmaceutical processes.

Palavras-chave: agricultural waste residues, *Bacillus atrophaeus*, decimal reduction time, orange juice processing

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