
Theobromine detection in cocoa products: an electrochemical sensor approach using Printex L6/Au and polyaniline

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Ensuring the quality and safety of food products is paramount, and accurate analysis of key compounds like theobromine (TB) in cocoa is essential. Traditional analytical methods can be complex or time-consuming, highlighting the need for more efficient solutions [1]. This work introduces a new, highly sensitive electrochemical sensor designed to quickly and precisely detect TB, particularly in challenging food matrices such as chocolate bar and chocolate powder. Our approach utilizes SPE, known for their affordability, ease of use, and adaptability [2]. We've significantly enhanced these electrodes by modifying them with a nanocomposite of Printex L6 carbon, electrodeposited Au and polyaniline. Electrochemical characterization showed that these modifications significantly enhanced the current response for TB oxidation. The optimized sensor performed excellently, offering a wide linear range (0.75 to 37.00 $\mu\text{mol L}^{-1}$) and an impressive low LOD (76 nmol L^{-1}). Critically, it demonstrated high selectivity against interferences, plus great electroanalytical stability evaluated by memory effect (SD: 0.01 μA). The measured TB levels—ranging from 0.11% to 0.58%—fell within the method's linear working range.

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References:

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