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## Abstracts Book

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# Design of innovative electrochemical genosensors for honey fraud and quality detection by botanical origin authentication

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Ensuring food safety has become a concern for companies, consumers and the government alike, due to the increase of fraudulent and/or adulterated food products found in the global market [1,2]. Some common fraudulent strategies include mislabelling a product's geographical origin and blending it with lower-grade substances [3].
Among the frequently adulterated food products there is honey. Honey is a highly sought-after natural food with an elevated environmental, social and commercial value due to its rich nutritional profile and numerous health benefits. However, it is also vulnerable to adulteration [4]. Therefore, it is important to develop an analytical technique that can quickly, cheaply, and easily assess the quality and safety of honeys worldwide.
In this work, an electrochemical genosensor for the detection of two plant species: *Erica arborea* and *Castanea sativa* in real honey samples was designed and optimized. The first step was the construction of the genosensor. For this, DNA-target probes capable of unequivocally detecting *E. arborea* and *C. sativa* DNA were selected and designed. As a sandwich-format strategy was adopted, their complementary probes were then cut into two smaller sequences to which a thiol group (DNA-capture) and a fluorescein (DNA-signalling) were attached.
Using chronoamperometry, the enzymatic amplification of the electrochemical signal was achieved with a concentration range of 0.07 to 2.00 nM. These results were then compared to the DNA from certified *E. arborea* and *C. sativa* plant leaves, amplified by PCR, and 10 commercial honeys found in local Portuguese markets. The developed genosensor was successfully applied for the detection of the DNA from the extracted plant leaves and commercial honey samples. So, the developed genosensor is a promising cost-effective and innovative analytical method to detect the botanical origin of real honeys.

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