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A Review on Modern Analytical Methods for Detecting and Quantifying Adulteration in Honey

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Abstract:

Honey has been a target for adulteration with various inexpensive industrial sugars. Discriminating between authentic and adulterated honey is a challenging problem for consumers. Several studies have proposed different methods for detecting adulterated honey. Traditional methods, such as stable carbon isotope ratio analysis, chromatography, and physicochemical parameter analysis, provided good qualitative and quantitative detection. These technologies utilize different approaches, such as profiles of honey constituents, physical and chemical properties of honey, and specific marker traces for the sugar adulterants. Spectroscopy and hyperspectral imaging provided fast and nondestructive detection with no sample preparation. Sensory techniques, such as low-cost optic fiber sensors, demonstrated their effectiveness in quantifying honey adulteration. This paper discusses various technologies for detecting and quantifying honey adulteration. We also discuss the machine learning models and their performance in this research.

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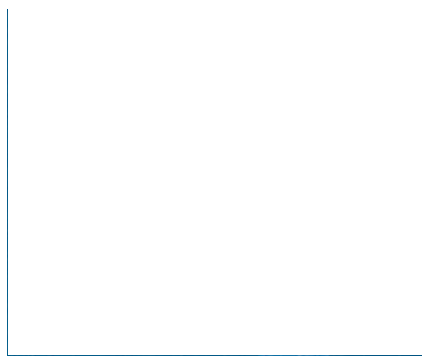
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I. Introduction

Honey has become an attractive target for adulteration due to its high economic value. This high-value commodity can be adulterated directly by mixing it with industrial sugar. Also, it can be falsified indirectly by overfeeding honeybees with industrial sugar. Honey admixture with commercial sugars has several consequences on consumer health, such as increased sugar and lipids in the blood [1]. Besides that, honey fraud leads to a substantial economic loss [2]. Thus, detecting honey adulteration is of great significance to ensure honey quality and safety.

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