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RESUMEN:
Saffron is a high-quality and expensive spice being widely subjected to adulteration. An UHPLC-ESI/QTOF-MS metabolomic-based approach was therefore used to investigate the discrimination potential between adulterated (added with different percentage of other parts of the flower) and authentic saffron, as well as to trace its geographical origin. Both unsupervised (hierarchical clustering) and supervised OPLS-DA multivariate statistics allowed discriminating authentic saffron from styles added of other floral components, as well as PDO (Protected Designation of Origin) vs non PDO saffron samples according to their chemical fingerprints. The proposed markers were then validated through ROC curves. Anthocyanins and glycosidic flavonols were the best markers of the styles' adulteration. However, other flavonoids (mainly free flavonols and flavones), together with protocatechuic aldehyde and isomeric forms of hydroxybenzoic acid, were also validated as markers for the discrimination of PDO vs non PDO saffron samples. This work outlines the potential of untargeted metabolomics based on UHPLC-ESI/QTOF mass spectrometry for saffron authenticity and traceability.

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