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Detection and Quantification of Active Pharmaceutical Ingredients as Adulterants in Garcinia cambogia Slimming Preparations Using NIR Spectroscopy Combined with Chemometrics

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Abstract : A rapid, simple and efficient method with minimal sample treatment was developed for authentication of Garcinia cambogia fruit peel powder, along with determining undeclared active pharmaceutical ingredients (APIs) in its herbal slimming dietary supplements using near infrared spectroscopy combined with chemometrics. Five featured adulterants, including sibutramine, metformin, orlistat, ephedrine, and theophylline are selected as target compounds. The Near infrared spectral data matrix of authentic Garcinia cambogia fruit peel and specimens degraded by intentional contamination with the five selected APIs was subjected to hierarchical clustering analysis to investigate their bundling figure. SIMCA models were established to ensure the genuiness of Garcinia cambogia fruit peel which resulted in perfect classification of all tested specimens. Adulterated samples were utilized for construction of PLSR models based on different APIs contents at minute levels of fraud practices (LOQ < 0.2% w/w).The suggested approach can be applied to enhance and guarantee the safety and quality of Garcinia fruit peel powder as raw material and in dietary supplements.

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