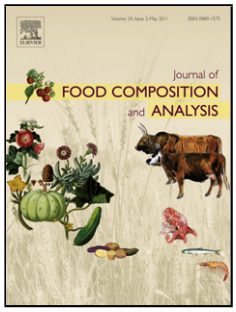

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Original Research Article

Determination of amino acids in white, green, black, oolong, pu-erh teas and tea products

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Abstract

An accurate method for the determination of 19 amino acids in tea with HPLC-UV after precolumn derivatization using 9-fluorenylmethyloxycarbonyl chloride (FMOC-Cl) has been developed. The gradient consisted of 0.1 M sodium acetate buffer pH (5.8) containing 0.05% (v/v) triethylamine (A) and 80% acetonitrile-water (B). The separation was performed on a Kinetex C 18 column at 40 °C and 262 nm detection wavelength. The developed method was validated showing an excellent linearity ($R^2 \geq 0.999$), high recovery rates (>91%) and low detection and quantification limits (LOD: 0.057-0.534 µg/mL; LOQ: 0.235-1.849 µg/mL). Free amino acids were determined in 86 tea samples and found to be the highest in white tea with an average of 25 mg/g and elevated contents of GABA and asparagine. An inverse relationship was observed between the degree of aeration (fermentation) and the content of amino acids, especially of arginine. In addition, two steeping time experiments were carried out and the extraction kinetics of individual amino acids was studied. The results obtained demonstrated the high extraction efficiency of theanine with about 50% of its total quantity after 2 min brewing time. Furthermore, a comparison with the proposed ISO method for theanine gave very similar results.