

Identification of plant components in food samples using next-generation sequencing methods

P.01-043-Mon

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Next generation sequencing (NGS) methods offer new opportunities for food component identification using the DNA metabarcoding approach. The goal of the presented study was to demonstrate the applicability of NGS methods for the identification of plant components in food samples. The analysis was performed using the internal transcribed spacer (*ITS*) region, which is widely used as a barcode for both plants and fungi. Enhanced primers for amplification of *ITS1/2* of plant species only were designed and tested. The local database of reference sequences was created using Genbank data, which were previously filtered (misannotated and duplicate entries were discarded). Eighteen food samples were examined (6 common black teas, 6 herbal teas, 6 seasonings) on both the Ion S5 and Illumina MiSeq platforms. The obtained results confirmed the presence of components declared by the manufactures in most cases. However, the adulteration of several herbal tea samples manufactured in China was found: only two out of six declared components were detected (*Camellia sp.* and *Senna sp.*), the other components represented the different climbing plants, such as *Ipomoea sp.* Moreover, significant amount of weed species were found in most samples, which is likely caused by the violation of the manufacture technologies. Several contaminant components that may cause allergic reaction (*Cynodon sp.*, *Ambrosia sp.*) were identified in three samples. Thereby, this work clearly demonstrates the applicability of NGS methods for plant species identification in food samples. The results obtained on the Ion S5 and MiSeq sequencing platforms were highly correlated and, moreover, outperformed the classic botanical analysis methods. Thus, NGS methods may become the “gold standard” in food quality control in the nearest future. This study was supported by Ministry of Education and Science of the Russian Federation, project # 14.609.21.0101 [grant number RFMEFI60917X0101].