BOOK OF ABSTRACTS

9th International Symposium on
RECENT ADVANCES IN FOOD ANALYSIS

November 5–8, 2019
Prague, Czech Republic

Jana Pulkrabová, Monika Tomaniová, Michel Nielen and Jana Hajšlová
Editors

UNIVERSITY OF CHEMISTRY AND TECHNOLOGY PRAGUE

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B27

AUTHENTICATION OF GINKGO BILOBA HERBAL PRODUCTS USING A SPECIES-SPECIFIC ITS1 MARKER

Liliana Grazina(1), **Joana Amaral**(2), **Joana Costa**(1), **Isabel Mafra***(1)

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Plants have been widely used worldwide for medicinal purposes, leading to the increased consumption of herbal products, such as herbal infusions and plant food supplements. The growing demand of these products leads, inevitably, to the global market growing of herbal products and, consequently, to their adulteration. *Ginkgo biloba* is a Chinese tree whose leaves are extensively used in herbal preparations, being a very popular phytomedicine with high economic value. It has well-established therapeutic indications for the improvement of (age-associated) cognitive impairment and of quality of life in mild dementia, and treatment of problems associated with the peripheral circulation [1,2]. Ginkgo products have been adulteration targets through the addition of pure flavonols/flavonol glycosides or substitution with other botanical species [2]. Therefore, this work aims at proposing a new species-specific PCR approach to detect and quantify *G. biloba* to assess the authenticity of products thereof.
Reference mixtures of known amounts (50% to 0.01%, w/w) of *G. biloba* leaves and *Cammelia sinensis* leaves were prepared. DNA was extracted from referencemixtures and other plant species using the Nucleospin Plant kit. Specific primers targeting the ITS1 region (Genbank: Y16892.1) were designed to amplify a 175 bp fragment of *G. biloba*. A species-specific PCR assay was developed and used to confirm the absence of cross-reactivity with other medicinal plant species. Afterwards, a quantitative real-time PCR assay with EvaGreen dye for *G. biloba* was developed and applied to binary mixtures of *G. biloba* in *C. sinensis.* A normalised calibration model was constructed based on the parallel amplification of the ITS1 region of *G. biloba* and the 18S rRNA gene (reference for eukaryotes). The normalised real-time PCR system allowed establishing a calibration curve covering the dynamic range of 50-0.1% (w/w) of ginkgo in *C. sinensis.* Additionally, a sensitivity down to 2 pg of ginkgo DNA was reached. The method exhibited adequate performance with values of correlation (0.996) and PCR efficiency (84.3%) in agreement with the acceptance criteria for these assays. The results showed that the proposed method could provide a species-specific quantitative tool for the authentication of herbal products containing ginkgo.

Booker, A., Frommenwiler, D., Reich, E., Horsfield, S., & Heinrich, M. (2016). Adulteration and poor quality of *Ginkgo biloba* supplements. *Journal of Herbal Medicine, 6*(2), 79-87.
Gafner, S. (2018). Adulteration of *Ginkgo biloba* leaf extract. *Botanical Adulterants Bulletin*, January 2018.

Keywords: *Plant food supplements, Real-time PCR quantification, Plant authentication, Ginkgo biloba*

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