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Chemical contaminants of medicinal plants and herbal teas

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Contamination of medicinal plants with undesirable chemical substances can occur as a result of environmental factors, agricultural procedures as well as during plants' storage or processing. The presence of contaminants such as heavy metals, polycyclic aromatic hydrocarbons (PAHs) or agrochemical residues (pesticides, fertilizers, mycotoxins, etc.), in medicinal plants and herbal teas may result in health risk to consumers, which are generally hoping that a natural remedy may represent a healing chance. The purpose of this study is to provide both a possible methodological framework and a valid dataset in order to gain a proper understanding of the true composition of medicinal plants and herbal teas, whose beneficial effects can be counterbalanced by harmful components. Several commercially available products were assessed in this study, targeting PAHs (by high performance liquid chromatography, using an Agilent 1100 system with fluorescence detection), heavy metals (by atomic absorption spectrophotometry, using a Shimadzu AA-6300 instrument), major anions (by ion chromatography, using a Shimadzu Prominence instrument with non-suppressed conductivity detection). Several samples were found to contain significant amounts of PAHs, heavy metals and nitrates (e.g. up to 45 µg/kg lead, up to 25 µg/kg cadmium, up to 45 mg/kg nitrate, etc.). The proposed approach for chemical contaminants' assessment can provide a useful basis for monitoring the safe use of medicinal herbs. The obtained results can be useful in studies for establishing the human exposure to PAHs, heavy metals and nitrates. More concerted efforts will be needed for a proper management of the risks associated with chemical contaminants in these products, while sustained analytical work towards collecting such data is desirable. The content of these contaminants has to be main criteria for the use of medicinal plants in the production of traditional remedies; hence it is essential to have a proper quality control of such raw materials.

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