

Chemical toxicity study of some Algerian medicinal plants

About 65 to 80% of the world's population use traditional medicine for their primary health WHO according to the WHO report. However, the use of herbal medicines has come under scrutiny due to their perceived long-term toxicity among other considerations, in another word there is usually a small window between nutrition and toxicity. The main reasons for the presence of toxic elements in medicinal plants are their individual properties, concentrations of metals in soil, air, and water, climatic factors; plant species and other environmental factors.



Fig. 1. Map of Algeria with the sampling localization of Djelfa province.

Controlling the content of toxic elements is one of the most important aspects of managing food safety, in order to establish tolerable intakes of different contaminants that exhibit thresholds of toxicity. The most often used terms regarding toxic elements intake, is tolerable daily intakes (TDIs) allocated by Joint FAO/WHO.

There are many analytical techniques for determining trace elements concentration in different biological matrices like particle induced X-ray emission, inductively coupled plasma mass spectrometry, atomic absorption spectrometry and instrumental neutron activation analysis. The signification of quality control and assurance (QC/QA) to internal and external validation is an indispensable step in the analytical procedure; in this context, requires that all steps must be checked. The INAA technique has been the most used in biological samples due to its multi-elemental character and high sensitivity.

The aim of the present work was to contribute by using nuclear analytical techniques, for determined concentrations of some toxic chemical elements (As, Br, Ce, Co, Cr and Sb); in eight

aromatic plants that are largely used in traditional Algerian medicine such as *Artemisia herba-alba* Asso., *Artemisia compestris* L., *Laurus nobilis* L., *Origanum vulgare* L., *Mentha spicata* L., *Rosmarinus officinalis* L., *Mentha pulegium* L. & *Pistacia lentiscus* L. Our selection of plants studied for this work refer to corresponds perfectly to the scientific needs because these samples widely used by the Algerian population in their health treatments. The results of the present work may be useful and will be used as a database for the researchers and specialists.

The eight studied taxa were collected during the year 2012 from the full steppe zone of Algeria, Djelfa province, distanced from Algiers of 300 km (Fig. 1).

In this study, six toxic chemical elements (As, Br, Ce, Co, Cr and Sb) were identified by INAA method.

Arsenic is a carcinogen and can cause cancer of the lungs, skin, bladder and liver; on the other hand, Intake of inorganic arsenic in lower concentrations may cause abnormal heart rhythm, decreased production of red and white blood cells.

Bromine is toxic and affects badly on human health, Br contents of different samples of plants were found to have a wide variation, this variation may be due to the use of bromine containing agricultural chemicals and pesticides such as methyl bromide, bromopropylate etc. Cobalt is considered an essential component of vitamin B12, but can accumulate in high levels in the liver, kidney, pancreas, and heart.

Deficiencies of chromium may cause heart conditions, but the uptake of too much chromium can cause adverse health effects as well, for instance, skin rashes.

Antimony is highly toxic element, the Agency for Toxic Substances and Disease Registry, has composed a comprehensive account of the public health effects of antimony.

In this study, we have assumed an intake ten-gram of plants leaves, and the average intake values per day and per person for toxic elements were determined.

The study has allowed us to know that the toxic elements concentrations in all the selected plants were well under estimated the permissible limits set by FAO/WHO for human consumption.

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Toxicological Aspect of Some Selected Medicinal Plant Samples Collected from Djelfa, Algeria

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