

## Making an imPACt

crease of environmental levels after a restriction; policy success control). Such a retrospective monitoring may be realized with samples from environmental specimen banks (ESBs). ESBs are collections of materials sampled with standardized methods and stored under conditions which assure that the chemical information does not change over time. Such archives are operated in several European and Asian countries as well as in the USA and Canada (website of the International ESB Group: [www.inter-esb.org](http://www.inter-esb.org)). Recent ESB monitoring studies provided valuable information on trends of chemicals like perfluorinated compounds, biocides, ingredients of personal care products, and other emerging substances. An example is shown in Figure 2.

Regarding the performance of environmental monitoring studies, the IUPAC project highlights the necessity of well-trained personnel and appropriate technical equipment, as well as the implementation of

quality assurance and quality control measures. It also emphasized that scientifically sound and feasible monitoring concepts strongly depend on a clear definition of the aim of each monitoring program or study. Decisions on sample handling, storage, and the analysis of the samples are important steps for the development of problem-oriented monitoring strategies. The same applies to the selection of appropriate sampling sites, which should be representative for the scenarios to be investigated. These steps are especially critical within international monitoring programs, to ensure the quality of the final monitoring data.

The project findings, based on relevant documents and discussions in the project group, were compiled in a review article published in *Environmental Science and Pollution Research*.

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## Stamps International

### Essential Chemistry

Almost 2000 years ago, the Greek military physician Dioscorides, author of *De Materia Medica*, an influential encyclopedia of herbal medicine, was the first to describe the therapeutic qualities of lavender. This flowering plant of the mint family has antiseptic and anti-inflammatory properties and its essential oil is now widely used as a fragrance ingredient in soaps, cosmetics, perfumes, and a variety of other health and personal care products. In a similar vein, essential oils produced from orange, peppermint, lemon, eucalyptus and hundreds of other plants and flowers have found applications ranging from air fresheners and scented candles to household cleaners and insect repellents.

The world market of essential oils, estimated at USD 5.5 billion in 2014, is expected to double in size by 2022 due in part to the increasing popularity of aromatherapy and a rising demand for natural flavors and fragrances in the food and beverage industry. However, it is also worth noting that a growing concern—and a key challenge—in the essential oil industry is the development of sustainable extraction and purification processes.

The stamp illustrated herein was issued in the French overseas territory of New Caledonia to commemorate

the centennial of the isolation and chemical analysis of the oil of niaouli. In 1893, the French biochemist Gabriel Bertrand (1867-1962), better known for his studies

pertaining to the physiological effects of essential trace elements, reported for the first time the key physical properties and composition of the oil of niaouli. The pale yellow oil was obtained by steam distillation in up to 2.5% yield from the leaves of *Melaleuca viridiflora*, a small evergreen tree endemic to New Caledonia, Papua New Guinea, and the coastal region of eastern Australia. The oil is a potent antiseptic, particularly against yeast infections, and is widely used in cosmetic products, including skin care lotions, soaps, mouthwashes, and toothpastes. Interestingly, a variety of the niaouli tree that grows in the Florida Everglades is considered a noxious weed and a serious threat to the integrity of the local ecosystem by the U.S. Department of Agriculture!



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