PL11 The potential of HPLC coupled with UV, MS and NMR in the discovery of new bioactive plant constituents

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Plants represent an extraordinary reservoir of novel molecules and there is currently a resurgence of interest in the vegetable kingdom as a possible source of new lead compounds for introduction into therapeutical screening programs. Plant constituents of interest are usually isolated following a bioactivity guided fractionation procedure. In order to render this approach more rapid and efficient, the dereplication of crude plant extracts with LC-hyphenated techniques represents a strategic element to avoid finding known constituents and to target the isolation of new bioactive compounds. Spectroscopic information can be obtained on-line, directly from crude plant extracts, with hyphenated techniques such as high performance liquid chromatography (HPLC) coupled to UV photodiode array detection (LC-DAD/UV), to mass spectrometry (LC/MS) and to nuclear magnetic resonance (LC/NMR) (1,2). In addition, LC-bioassay based on microfractionation of the LC-peaks followed by TLC bioautography allows a rapid and precise estimation of the bioactivity of a given peak. LC/UV/MS and LC/NMR combined with LC-bioassays have permitted the rapid identification or localisation of compounds presenting antifungal or antioxidant activities in various plant species, as in the on-line identification of various potent antifungal prenylated isoflavonoids from a Leguminosae, *Erythrina vogelii*. LC/MS and LC/NMR were also used for the study of compounds which are difficult to isolate on a preparative scale; they were particularly useful, for example, for the investigation of unstable iridoids from *Jamesbrittenia fodina* (Scrophulariaceae). In this case, light induced *cis/trans* isomerisation as well as transesterification of cinnamic acid moieties could be shown.
LC/NMR and LC/MS are powerful tools for solving phytochemical problems. They allow a rapid estimation of the interest of a given compound in a complex extract and are also very useful for the detection of toxic compounds in phytopharmaceuticals. These techniques do not replace the activity-guided fractionation of the extracts, but provide a strategic complement to standard isolation procedures. Furthermore, they permit the recording of the spectroscopic data of labile constituents which cannot be recorded by other means.

References: 1. Hostettmann, K. et al. (2002) Pharm. Biol. 39: 18-32, **2.** Wolfender J.-L. et al. (2001) Phytochem. Anal. 12: 2-22.

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Prof. Hostettmann studied chemistry at the University of Neuchâtel (Switzerland). After a postdoctoral stay at Columbia University, New York, he joined the Department of Pharmacy of ETH Zürich as senior research associate. At the same time, he had teaching duties as privat-docent at the University of Neuchâtel and at the University of Fribourg as lecturer. Since 1981, he is Professor at the University of Lausanne and Director of the Institute of Pharmacognosy and Phytochemistry. Since 1997, he is also in charge of the pharmacognosy teaching at the University of Geneva.
He is involved in the phytochemical investigation of plants used in traditional medicine. The aim of his research is to find new lead compounds from Nature which could become drugs. He is also interested in the development of new separation techniques for natural products. He is the author of more than 450 publications, of 60 chapters in books and of 10 books. Among them, one has been translated in Japanese, in Chinese, in Spanish and Indonesian language. He obtained several distinctions, for example he is Dr. *honoris causa* of the University of Medicine and Pharmacy of Iasi, Romania and is Honorary Professor at Nanjing University, China.