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Natural products as active agents: On the border between sustainable application and risky use

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Natural products from renewable resources have been applied in all parts of the world since beginning of time. It is hence obvious to use compounds from natural origins nowadays in sustainable concepts of Green Chemistry. Typical applications can be found in the fields of plant protecting agents, food additives and pharmaceutical drugs. However, an uncritical application of natural products can cause several problems. Nature optimized structures and concomitant functions of "applicable" natural products much earlier than human beings lived on earth. Therefore these compounds are not adapted to our necessities and we use them for purposes and in environments completely different from those originally intended by nature. Effects of the natural products to humans are also often influenced by structural changes during isolation or by formation of complexes in combined use with other compounds. The possibilities of these alterations have to be considered within isolation procedures and applications to avoid difficulties caused by unwanted effects of modified compounds from natural sources. Three examples are presented, which exemplary show chances and risks in the work up and application of natural products. First one deals with antifungal activity of compounds from Glycosmis species and structural changes during their isolation. The second example shows different chemical structures in the morphological very similar plants Carapichea ipecacuanha (Ipecac) and Ronabea emetica (false Ipecac), both causing comparable pharmaceutical effects. Finally the use of highly toxic aconitine from Aconitum carmichaelii in the Chinese tea 'Si Ni Tang' (SNT) is discussed.

Biography

Lothar Brecker received his diploma and PhD in Chemistry from the University of Dortmund in 1993 and 1996, respectively. After working at Graz University of Technology and Research Center Borstel, he became an Associate Professor at the University of Vienna. There he actually serves as Vice Dean of the Faculty of Chemistry, Director of the Chemistry Studies Program and Deputy Head of the Department of Organic Chemistry. His main research activities are in the fields of using NMR to study enzyme ligand binding, interactions between small molecules, and structure determination of natural products. He has published 90 papers in reputable journals.

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