

Ethnopharmacology

The combination of Australia's biodiversity and the rich medicinal knowledge of its indigenous people creates ample research potential for Natural Product Chemistry

As a new member of the Association for Australian Studies I would like to bring attention to an exciting research field which not all members of the Society might be familiar with – so-called *Traditional Bush Medicine*, an investigation of traditionally used medicinal plants and organisms.

In today's highly competitive pharmaceutical research, natural products from terrestrial and marine plants and organisms, which are capable of creating unusual chemical structures following a myriad of unpredictable biochemical pathways, provide a unique source of molecular diversity. They represent therefore an invaluable reservoir in the search for new medicinally active compounds. Its enormous biodiversity with 85% of flowering plants and mammals, 90% of frogs and reptiles and 45% of its birds being endemic,¹ makes Australia a prime location in the search for new naturally derived bioactive compounds.

One approach to this huge biota is the continuously refined method of high-throughput screening, in which extracts of natural products are subject to a range of disease-targeted tests. The outcomes give an indication of potentially beneficial medicinal effects in promising candidates which are then more thoroughly investigated. AMRAD Discovery Technology (ADT) in Victoria as well as AstraZeneca in a joint venture project with Griffith University in Queensland are currently leading the Australian efforts in this field. AMRAD, for instance, has until September 1998 screened about 250,000 samples in 1.9 million tests at a growing rate of approximately 70,000 new extracts every year and consequently identified 15 plant families, which are now under close scrutiny.²

A different approach to Australia's enormous biodiversity in the search for compounds with potentially beneficial therapeutic effects is taken by the discipline of *Ethnopharmacology*, a cross-disciplinary effort by pharmacists, botanists, chemists and anthropologists to investigate the traditional use of certain natural resources. Their successful application over many decades or even centuries may be seen as a strong indication for bioactivity and can point towards possible valuable medicinal sources, facilitating what could otherwise easily turn into the famous search of the needle in the haystack. As one of the oldest living cultures in the world, Australia's indigenous people have been able to acquire an incredibly detailed knowledge of their land and elaborate skills in accepting nature's challenges. Their medicinal knowledge is profound and orally passed on to the next generation, although that aspect of Aboriginal culture is also in acute danger of being absorbed and, thus, lost in an often overwhelming 'white' society.

Against this background, a new discovery and appreciation of that knowledge by non-Aboriginals is pleasing to see and more and more joint efforts between indigenous consultants and ethnobotanists and pharmacists emerge which benefit both sides: They help to compile a record of Aboriginal medicinal use of native plants and animals for posterity and may so even re-ignite interest in the younger Aboriginal generation and at the same time can provide a head start into the search for new pharmaceutical drugs.

One of the early examples for such a successful cooperative venture was the publication of a beautiful book³, *Traditional Bush Medicines – An Aboriginal Pharmacopoeia*, a joint effort between Aboriginal communities across the Northern Territory and dedicated ethnobotanists, which became known across Australia's border and made its headlines even in the German pharmaceutical community. In fact, it was this publication which inspired me, a pharmacist myself, almost ten years ago to make first contacts with Australian universities researching in that field and eventually led to my involvement in Curtin University of Technology's (Perth) Traditional Bush Medicine research program and later also to my own PhD project in Natural Product Chemistry at the Northern Territory University in Darwin many years later.

There is, however, as so often in life, a backside to the coin, known and more and more openly criticised as 'biopiracy' – the danger of exploiting traditional indigenous knowledge without any benefits for the Aboriginal communities, a trend, which not only affects Australia but even more so indigenous people in the rainforests of Central and South America which are currently hot spots for this kind of pharmaceutical research. Since that knowledge is often undocumented, it is almost impossible to claim intellectual property rights. Maybe Western Australia's fairly famous 'Smoke Bush case' from the 1970s helped to raise awareness for this legally difficult field: Conocurvone, extracted from that plant (*Conospermum* sp.), was found by the National Cancer Institute of the United States to have promising activity against HIV, which prompted them to apply for patent protection of their discovery. Only the Australian lobbying, arguing with Aboriginal and subsequently also non-indigenous knowledge of the plant's bioactivity, ensured that the Western Australian government was included as co-owner of the patent rights.¹

Commercial prospects of Australia's biodiversity sieved through traditional Aboriginal medicinal use are becoming more and more interesting for researchers in Australia and also around the world and it can only be hoped that this will foster positive developments towards a reconciliation of often competing interests in the field.

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¹ Hustwick, C. 1999. Bioprospecting and the law. *Chemistry in Australia* 9: 9-10.

² Website for AMRAD Corporation Limited: www.amrad.com.au

³ Aboriginal Communities of the Northern Territory of Australia 1988. *Traditional Bush Medicines – An Aboriginal Pharmacopoeia*. Richmond: Greenhouse Publications;

The book was updated and expanded as: *Aboriginal Communities of the Northern Territory 1993. Traditional Aboriginal Medicines in the Northern Territory of Australia*. Darwin: Conservation Commission of the Northern Territory of Australia.