From lichen chemistry to lichen herbaria: the lichen research group in Rennes

Joël Boustie[1,2,3], Sophie Tomasi[1,2], Francoise Le Devehat[1,2], Marylene Chollet-Krugler[1,2], Béatrice Legouin[1], Philippe Uriac[1,2], Audrey Chambet[2,3], Jean-Yves Monnat[2], Joël Esnault[2,4]

[1]Institute of Chemistry of Rennes, University of Rennes, France, [2]French Lichenological Society, [3]Cultural, Scientific and Technical Heritage of Rennes, France, [4]Conservatoire Botanique National de Brest, France

Since the early 2000, a phytochemist group in the University of Rennes1 is focusing its research on secondary lichen metabolites to be valued, mainly for pharmaceutical properties. The work is carried on with full respect of lichen preservation and collaboration with lichenologists is a key point to go on. The team is composed of chemists (phytochemists, analytical, organic and medicinal chemists). Two unique lichen herbaria (H des Abbayes and L JC Massé) which are preserved as associated facilities to the lab are also kept and valued with their attached library. Some results on lichen chemistry will be presented along with perspectives for the development of new analytical tools. Mass spectroscopy and other analytical methods, particularly suitable to obtain accurate data will be discussed. Results obtained with minute amounts of lichen material allow to include some historical herbarium specimens and generate informative data through histolocalization of lichen metabolites. As the lab activities are expanding through the study and cultivation of the bacteria associated to the lichen thallus, along with international networks, interdisciplinary approaches appear to be a challenge and a real opportunity.

Antifungal activities of crude extracts of *Parmotrema* against some plant pathogenic fungi

Kawinnat Buaruang[1], Leka Manoch[2], Chiradej Chamswarng[3], Pachara Mongkolsuk[1]

[1]Faculty of Science, Ramkhamhaeng University, Bangkok, Thailand, [2]Faculty of Agriculture, Kasetsart University, Bangkok, Thailand, [3]Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, Nakhon Pathom, Thailand

The three dominant species of Parmelioid lichens were collected at Phu Luang Wildlife Sanctuary and identified as *Parmotrema gardneri*, *P. maclayanum* and *P. tinctorum*. They were air-dried for 24 hrs., and then macerated and extracted in either dichloromethane or ethyl acetate for 48 hrs. The dried crude extracts were suspended in dimethyl sulphoxide and tested for antifungal activity against the mycelial growth of seven plant pathogenic fungi including *Botrytis cinerea*, *Colletotrichum gloeosporioides*, *Curvularia lunata*, *Fusarium moniliforme*, *Phytophthora palmivora*, *Pythium aphanidermatum* and *Sclerotium rolfsii*. The dichloromethane crude extract of *Parmotrema maclayanum* possessed the greatest bioactivity of all of the lichen extracts tested. At 500 ppm it produced effective inhibition to the mycelial growth of *Botrytis cinerea*, *Phytophthora palmivora* and *Pythium aphanidermatum* at 94, 87 and 94%, respectively, whereas it inhibited 70, 78% mycelial growth of *Colletotrichum gloeosporioides* (70%) and *Curvularia lunata* (78%). The dichloromethane and ethyl acetate extracts of the other lichens also were effective against the test fungi but not to the same extent. This work points out the prospects of finding interesting novel sources of bioactive compounds from the world's lichens.

Cancelled

Aspects of biodiversity and chemical diversity studied in Hungarian lichen herbaria

Edit Farkas[1], Bernadett Biró[1], Mónika Sinigla[2], László Lőkös[3]

[1]Institute of Ecology and Botany, MTA Centre for Ecological Research, HAS, Vácrátót, Hungary, [2]Bakony Museum of the Hungarian Natural History Museum, Zirc, Hungary, [3]Hungarian Natural History Museum, Budapest, Hungary

Due to HPTLC studies the knowledge of lichen substances in Hungarian samples has developed a lot since 1998. The distribution patterns of secondary metabolites within lichen thalli are often taxon specific, and therefore have been widely used in lichen taxonomy and systematics since they represent cryptic chemical diversity additional to morphological-anatomical biodiversity. *Cetrelia* and *Xanthoparmelia* species were studied in details. A total of 430 specimens of historical and recent collections (6 Hungarian herbaria) were studied mostly from Central Europe, the Balkan and Eastern Asia. Vegetative propagules (soredia, isidia), pseudocyphellae, rhizines, features of lower surface are the main morphological characters analysed against alectoronic acid, anziaic acid, α-collatolic acid, imbricaric acid, 4-demethyl imbricaric acid, microphyllinic acid, 4-O-demethylmicrophyllinic acid, olivetoric acid, 4-O-methylolivetoric acid, perlatolic acid, physodic acid, 4-O-methylphysodic acid (*Cetrelia*), fumarprotocetraric acid, norstictic acid, salazinic acid, stictic acid (*Xanthoparmelia*). Cortical pigments, atranorin in *Cetrelia*, usnic acid in *Xanthoparmelia* are usually present, but some specimens are lacking these substances. Comparing the distribution of species before and after the taxonomic revision based both on morphology and lichen secondary chemistry, several striking examples are presented for demonstrating the importance of lichen substances in identification. Our work was supported by the Hungarian Scientific Research Fund (OTKA K81232).