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Benefits of Thin Layer Chromatography for the Pharmaceutical Industry

Fingerprints for Isolating Biologically Active Materials in Indigenous Medicines

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Thin layer chromatography (TLC) offers a rapid, inexpensive and reproducible method for screening of medicinal plants. As such a plethora of plant material to still evaluate and test for biological activity and hopefully useful medicinal products, plant material continues to play a role in the identification of lead compounds for the pharmaceutical industry. As the pharmaceutical companies begin to "run dry" of patent protected blockbuster compounds there is once again a renewed interest in medicinal chemistry for leads in novel structure chemistries.

Newer compounds must be found for the treatment of bacterial infections which have developed methods for getting around virtually all antibiotic chemotherapy. Vaccines have been effective against some bacterial antigens, but no vaccines have been found against any of the major parasitic infections. The rush is on once again for evaluating medicinal plant chemistry.

One place which is suddenly receiving much attention is sub Saharan Africa. This region of Africa contains 60,000 species of plants, which is roughly 1/4 of the world's species of plants. People have lived longer in sub Saharan Africa than anywhere else on earth. Millions of years of hominid species through trial and error identified medicinal plants with remarkable biological activity. In spite of this and cultural barriers the experience with these remarkable plants has been ignored. Newer chemistry techniques are being used for the identification of potentially useful medical compounds. TLC is the ideal tool for finding these compounds especially Aluminas.

An example of a native medicinal plant being studied in Africa is *Siphonochiles aethiopicum*. This is also known as ginger. It is widely distributed in tropical Africa, from South Africa northwards to Zambia, Malawi, Ethiopia, West Africa. The plant part used is the rhizome and the flesh roots. The product is available from commercial plantations and rapid production is possible. Utilization of DAI preparative TLC and then the use of DAI Dry Column Chromatography for purification speeds up the process. The rhizomes and roots are harvested at the end of the growing season when the plants are mature. In traditional medicine a small piece of the rhizome is chewed. In Malawi traditional medicine belief is that the plant is used for the treatment of coughs, colds and asthma. The main traditional use of the rhizome by the Zulu people has been in the treatment of malaria and vulvovaginal, and mucocutaneous candidiasis.

Extracts of the rhizome have proven to have significant antibacterial activity against gram positive bacteria, but have anti-viral activity. The produce is rich in essential oil and contains more than 70 monoterpenoids and sesquiterpene cineole, cis-alloocinene, alpha-terpineol and gemacrene B. The main furanoterpenoid, siphonochilone, represents the essential oil.

To identify the biologically important compounds the rhizome material is ground and then extracted using water. The solvents separate the compounds into polar, intermediate and non polar compounds. Then fingerprints are created for biologically active compounds using TLC technology. Ideally it is suggested to first use two dimensional TLC for separating compounds. The chemical fingerprint of TLC has been demonstrated to be an identification tool for traditional medicine.

To date, there is little in the way of toxicity data. The LD50 brine shrimp toxicity assay is greater than 2000 ug/ml. The oral LD50 is 0.409 ug/ml.

It is hoped that recent experience with this compound will help to stimulate interest in many other important medicinal indigenous plants and which have heretofore not been fully examined or explored.

Similar use of TLC, (see DAI TLC applications), to create fingerprints for biologically important compounds is being used for indigenous plant materials from South America, Europe and Asia.

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