

Recycling preparative HPLC for isolation of styryl-lactones from *Goniothalamus lanceolatus*

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The forest of Borneo presents a diversity of flora and fauna which may hold the secret ingredients and compounds to treat many serious and chronic illnesses. Researchers from ATTA-UR-Rahman Institute For Natural Product Discovery, Universiti Teknologi MARA, Malaysia carried out a study on one such indigenous plant found in the jungles of Borneo.

The rich Malaysian flora provides opportunities for the discovery of [novel compounds](#), some of which could have useful bioactivities. Our rich tropical rain forests may be the answer to the many problems in the treatment of various chronic diseases. This study focuses on an indigenous plant of Sarawak. However, this may only be discovered through comprehensive and systematic chemical and biological investigations.

A plant from the genus *Goniothalamus* of the family of Annonaceae, namely *Goniothalamus lanceolatus* was chosen for the phytochemical and biological activity study. Pharmacological studies done on *Goniothalamus* sp. has proven that this genus consistently produces acetogenins and styryl-lactones which are cytotoxic against many cancer cells such as pancreatic carcinoma cells, kidney, breast, colon and many more, making this plant an exciting topic of research in phytochemistry and oncopharmacology after Taxol. *Goniothalamus lanceolatus* has been used as herbal extract by indigenous natives of Sarawak to cure or

prevent certain types of illnesses, for example, it is used as alternative medicine for curing cancer. Certain parts of the plant are boiled in hot water and used as herbal steam bath to cure or prevent skin diseases.

In view of the traditional usage, promising biological activities and chemical data of this plant, in addition to the structure modification of isolated compounds and the study of biological activities was carried out. This study intends to discover bioactive chemical constituents and derivatives from *Goniothalamus lanceolatus* which may have pharmacological potential as lead compounds for drugs discovery initiatives from local Malaysian plants and later, further research may then be undertaken on the possible development of cheap useful herbal health remedies from these plants which may increase economic values of our tropical [plants](#).

Goniothalamus lanceolatus plant material was collected from Borneo, Malaysia. Plant extraction was carried out by cold percolation. Two kg of dried, ground bark of the plant was first defatted in hexane for three days at room temperature then filtered, and the solvent evaporated to dryness. They were then re-extracted with dichloromethane solvent for another three days. Evaporation of solvent under vacuum gave dichloromethane crude extract. Twelve gram of the crude extract was subjected to fractionation using Medium Performance Liquid Chromatography (MPLC) to afford series of fractions. The fractions were separated using gradient Preparative High Performance Liquid Chromatography (HPLC) using ODS column eluted with methanol-water. Unfortunately, some compounds resist to be separated due to having similar retention characteristic. Further separations were done by using Recycling Preparative HPLC over ODS using isocratic solvent of methanol-water as mobile phase.

After series of recycles, the compounds were successfully isolated with high recovery rate and purity. While in the recycling mode, there was no

consumption of solvent. Recycling preparative HPLC is indeed an efficient, effective and cost saving method for the isolation and purification of natural products. Natural compounds occur as various isomeric or closely or related structures in biological matrices. These compounds are difficult to be separated in complex mixtures, and hence, the need for effective and innovative separation techniques arises. Recycling HPLC allow the recycle of sample, in part or full, and increases separation efficiency of the process while keeping the peak dispersion to a minimum. Recycling in an HPLC system has not been utilized to its fullest. It has been used recently in the isolation and purification of different types of natural products including enantiomers, diastereomers, epimers, position isomers, and structurally related or unrelated compounds having similar retention characteristics.

Nevertheless, this technique still needs to be popularized among the chemists in conducting isolation of specific [compounds](#), so that the difficulties involved in the separation of the [natural products](#) may be minimized.

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