

Letters to the Editor

Potential Pharmaceutical Applications of Endemic Plants: When will Sri Lanka Understand the Economic Value Chain?

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Date Received: 11-12-2021 Date Accepted: 17-12-2021

Small molecules has been a main concern in the pharmaceutical industry for as long as they have existed. Enormous libraries of compounds have been collected and they in turn nurture drug discovery research. For example, big pharma, has in their compound libraries ranging from 500,000 to several million. Examining the drugs in the market, it is clear from where most are arriving: natural origin; out of the 1,328 new chemical entities approved as drugs between 1981 and 2016, only 359 were purely of synthetic origin. In the list of remaining ones, 326 were “biologics”, and 94 were vaccines. Importantly, 549 were from natural origin or arose motivated from natural compounds. Furthermore, anticancer compounds arising during the same period (1981–2014), only 23 were purely synthetic (Newman and Cragg, 2016). Natural origin can count for three categories: unaltered natural products; distinct mixture of natural products and natural product derivatives isolated from plants or other living organisms such as fungi, sponges, lichens, or microorganisms; and products modified through application of medicinal chemistry. There are many examples covering a wide spectrum of diseases: anticancer drugs such as docetaxel (Taxotere™), paclitaxel (Taxol™), vinblastine, podophyllotoxin (Condylin™), or etoposide; steroidal hormones such as progesterone, norgestrel, or cortisone; cardiac glycosides such as digitoxigenin; antibiotics like penicillin, streptomycin, and cephalosporins.

The emphasis on the use of medicinal plants had hitherto been placed on the treatment rather than prevention of diseases. However, there exists in the literature, considerable reports in recent times on research work on the use of medicinal plants and their constituents in disease prevention. A World Health Organisation (WHO) Expert Group defined Traditional Medicine as the sum total of all knowledge and practices, whether justifiable or not, used in diagnosis, prevention and elimination of physical, mental, or social disparity and relying exclusively on practical experience and observation handed down from generation to generation, verbally or in writing.

The World Conservation Monitoring Centre has designated Sri Lanka as a biodiversity ‘hotspot’. The indigenous flora of Sri Lanka comprises about 7,500 plant species. Of the recorded 3,154 flowering plant species, 894 (28 %) species are known to be endemic to the island. There are also records of 336

species of pteridophytes, which include 49 endemics, over 1000 species of lichens belonging to the family Thelotremaaceae (41 endemics), 575 mosses (endemism unknown), 303 liverworts (endemism unknown), 1920 species of fungi and some 900 species of algae. The variety, richness and abundance of Sri Lankan flora and the high percentage of endemic plants - compared to most countries in the region - makes it a viable setting for a systematic drug discovery programme.

The early botanical description of Sri Lankan plants is contained in a series of books by Trimen in 1885, were revised later by Dassanayake in 1996. Endemic plants in Sri Lanka are within easy access as more than 90 % of them are found in a small area of about 15,000 km² in the low country wet zone and the montane zone. A large number of plants with medicinal value has been listed in 'Sinhalese Materia Medica'.

In spite of this rich knowledge of Sri Lanka's plants, the country lags behind in investment in research into its medicinal value. For example, out of the 30 patents (mostly foreign) covering the compounds and extracts of *Salacia reticulata* var. *diandra* (Kothala Himbutu) found in Sri Lanka and India, several Japanese patents claim anti-diabetic properties of its aqueous extracts. The claims of these patents have been made notwithstanding the practice of using *S. reticulata* in the treatment of high blood-sugar, which is part of the traditional knowledge of Sri Lanka; and furthermore, its antidiabetic efficacy had been demonstrated by Karunanayake et al. (1984) prior to the approval of these patents. In addition, this plant has been extensively studied in Sri Lanka (Tezuka et al., 1994).

Sri Lanka has more endemic flora per unit area than any country in Asia. The economic value of conservation of the knowledge within the endemic flora for the benefit of the country is equally important. Clearly, more scientific research must be done to investigate the endemic flora for medicinal and other important agents. Thus far, the flora of Sri Lanka has not been subjected to a major drug discovery program. Central Bank in its annual reports treats Sri Lanka's Forest reserves only for its timber value. Although medicinal plants growing in forests appear as a minor discussion point, medicines from the endemic plants or their ecosystem services are ignored (Gunatilleke, 2015). No wonder, there is little emphasis placed on this important aspect of the national heritage by both policymakers and granting agencies.

References

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