



Conservation of certain indigenous medicinal plant of upper Brahmaputra valley of Assam: Computational Biology approach

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Abstract

The change of agricultural practices and other anthropogenic causes has threatened the nature's unique genetic resources in the verge of extinction. In addition to that very little or no sufficient systematic studies have been done to explore and conserve the medicinal and nutritive potentials of these unique genetic resources. However, there are number of commercially available drugs derived from plant sources and also ever increasing demand for the herbal medicine in recent days in the domestic as well as international market. So there is a distinct need for an easy accessible data collection system that provides detailed scientific information of the plants. Keeping these points on mind computational biology techniques are used to construct web-enabled medicinal plant database system for easy retrieval of taxonomic information, photographs, medicinal properties and bioactive compounds of such important plants in the Upper Brahmaputra valley of Assam for scientific users, researchers and home users who interested in medical plants.

Key-Words: Computational Biology, Database, Medicinal Plants

Introduction

All cultures from ancient times to the present day have used plants as a source of medicines. In India, medicinal plants sector has traditionally occupied an important position in the socio cultural, spiritual and medicinal arena of rural and tribal lives. Demand for medicinal plants is increasing in both developing and developed countries due to growing recognition of natural products being non-narcotic, having no side-effects, easily available at affordable prices and sometime the only source of health care available to the poor. It is well recognised that the problems of conservation and development are linked, and so attempts to tackle them should be integrated¹. Accordingly, contemporary policies for conservation, such as the Convention on Biological Diversity (CBD) and the Global Strategy for Plant Conservation (GSPC) make it clear that conservation must take human needs into account². The great surge of public interest in the use of plants as medicines has been based on the assumption that the plants will be available on a continuing basis. However, no concerted effort has been made to ensure this, in the face of the threats posed by increasing demand, a vastly increasing human population and extensive destruction of plant-rich habitats.

Today many medicinal plants face extinction or severe genetic loss, but detailed information is lacking. For most of the endangered medicinal plant species no conservation action has been taken. For most countries, there is not even a complete inventory of medicinal plants. Much of the knowledge on their use is held by traditional societies, whose very existence is now under threat and little of this information has been recorded in a systematic manner.

In the light of this situation, our present study is aimed to digitalize the compiled information on traditionally used potential medicinal flora of upper Assam along with their geographic and temporal distributions; because Assam, one of the biodiversity rich regions and second largest state of Northeast India situated between 24°2'-27°6'N latitude and 89°8'-96°E longitude covering an area of 78,438 sq km of which 23,688 sq km area is covered by forest. Being a gene rich and technology poor region, a section of the population is entirely dependent in herbal medicines prepared from locally available herbs. However, the change of agricultural practices and other anthropogenic causes has threatened the nature's unique genetic resources in the verge of extinction. In addition to that very little or no sufficient systematic studies have been done to explore and conserve the medicinal and nutritive potentials of this natural biological heritage of mankind. The region has richest

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indigenous knowledge systems on biodiversity and herbal cure, but still it is nowhere in IPR holdings.

Methodology

The information on ethno-medicinal plant and their uses were collected through a massive exploration drive and purely freelance manner from five districts, namely Tinsukia, Dibrugarh, Sivasagar, Jorhat, Golaghat of upper Brahmaputra valley, Assam. The plants were identified according to Flora of Assam³ and other standard. Based upon this information, designed a web enabled information system relying on object-oriented database⁴ technology. The access to this database is free of charge and available to scientific users, researchers and home users who interested in medical plants.

Results and Discussion

The Database on ethno medicinal plant is used an appropriate combination of server side and client side software technology to manage and share plant information in a systematic manner in order to make a user friendly and an effective information system. At the very beginning a local database was hosted on local computers in the Department of Life Sciences, Dibrugarh University with the help of Microsoft Access forms based software application and SQL Server to manage data in a proper way. Later on WampServer⁵ (Version 2.0) was used to create an advance web enabled information system, which was combination of Apache with PHP⁶ (Hypertext Pre-processor) server-side language and the MySQL database. Medicinal plant species from the five districts of upper Brahmaputra valley, Assam are searchable by scientific and common name (Assamese name), including synonyms. Information is made available at the family, genus and species taxonomic classification levels, including distribution map, traditional medicinal uses, bioactive compounds, plant photographs and additional important information such as ecological habitat, phenology, brief description about geography, climate, population, vegetation and different communities of five district of upper Brahmaputra valley, Assam also available through our database. We are currently implementing targeted links from our database to some specific related external websites such as Convention on Biological Diversity (CBD), Species 2000, The International Plant Names Index (IPNI), The Nature Conservancy etc. Feed back form has been designed and incorporated to interact and share knowledge with a broad and heterogeneous group of users internationally. Administrative users utilize a

secure web based administrative page to manage and update information at a regular basis.

The realm of biodiversity informatics are information systems which able to link geographic, climatic and environmental information along with wide aspects of organisms such as taxonomy, habitat, distribution, pictures, population trends, specimens, uses, conservation status⁷. This type of information system can make significant contributions to human well-being, particularly through promoting the sustainable use of medicinal plants for healthcare. We believe that the information system will give utility to the scientific community for a quick review on plants, used for different diseases and provides enormous scope for development of new novel drugs of plant origin and it may also help to screen the prioritized species to be placed under effective conservation measures and for sustainable utilization for the future generation.

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