

ICT Applications in Medicinal and Aromatic Plants

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Abstract—Medicinal plants are nature's wonderful gift to the mankind. The relationship between the human beings and the plants is as old as the history of the mankind itself. Since time immemorial, human beings have been utilizing plants for basic curative health care. The use of plants as a source of medicine is, in fact, based on the experience of many generations of traditional physicians and herbal practitioners of different ethnic societies, prevailing all over the world. The World Health Organization (WHO) has listed over 21,000 species that have been reported for medical uses around the world. Moreover, it estimates that more than 80 percent of the world's population relies on traditional health care. It is also reported that 25% of the drugs are derived from plant sources and many others are actually synthetic analogues isolated from plant species in modern pharmacopoeia.

There are number of medicinal and aromatic plant species available in India and much of the species are unrecorded or poorly documented in the Country. The Directorate of Medicinal & Aromatic Plants Research (DMAPR) has tried its best to digitalize available information through development of Information and Communication Technology (ICT) applications to promote the medicinal and aromatic plants and use of these valuable resources in an efficient sustainable manner, which can easily be accessible to the public. These applications have extensive use and would work as a delivery system for extension information and to disseminate the up-to-date scientific information in a readily accessible and easily understood form to the users. This paper reports the latest developments of ICT applications in medicinal and aromatic plants.

Keywords: Information Technology, Communication Technology, Medicinal Plants, Aromatic Plants, Expert Systems, Decision Support Systems, Database

1. INTRODUCTION

An electronic resource (E-Resource) is defined as a resource which requires computer access or any electronic product that delivers a collection of data, web based applications, electronic journals, image collections, other multimedia products. E-Resources are vital for research and development purposes. They provide quick access to information, serve as a quick method for extracting information from a huge amount of data etc. ^[1, 5] In case of medicinal & aromatic plants, databases on various aspects like herbaria, photo library, herbal gardens information, trader's data, references data, etc., are vital for researchers on medicinal & aromatic plants.

Hence, Digital herbarium of medicinal & aromatic plants in India, Digital photo library of medicinal & aromatic plants, Networking of Herbal gardens in India, Medicinal & aromatic plants references information system, Open access journal of medicinal and aromatic plants were developed on above aspects related to medicinal & aromatic plants.

DMAPR was established in 1992 at Anand, Gujarat, India to strengthen the basic, strategic and applied research on medicinal & aromatic plants ^[6] by the Indian Council of Agricultural Research (ICAR) which is an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture & Farmers Welfare, Government of India ^[7]. DMAPR also houses the headquarters of the All-India Co-ordinated Research Projects on Medicinal and Aromatic Plants and Betelvine as its outreach programme. It has two well maintained experimental farms along with medicinal plants botanical garden and field gene bank. The Directorate also has modern sophisticated instrumentation facilities, quality control, tissue culture, Information and Communication Technology (AKMU) lab and molecular biology labs.

DMAPR is being focused on collection, maintenance, cultivation, evaluation of medicinal and aromatic plants germplasm, carrying out research on selected crops, dissemination of research through publications and open access databases to serve the nation. In this endeavor, the Directorate's state-of-art AKMU lab has digitalized the information on medicinal and aromatic plants, developed various ICT applications and hosted in the World Wide Web for free access to the public.

In this back drop, the ICT applications in medicinal and aromatic plants in general and extension in particular are discussed in this paper.

2. RESULTS & DISCUSSION:

2.1 Digital Herbarium of M&AP:

A digital herbarium is an authenticated collection of 350 plant specimens with associated label and research data. Each

herbarium specimen contains high resolution image of the specimen as well as label information detailing attributes of the specimen such as species name in English, Hindi, Sanskrit, the collector/s name, distribution, habit, usage, varieties, soil, climate, propagation, planting, irrigation etc.

A number of high resolution photographs of medicinal and aromatic plants were captured and also collected from secondary sources from different parts of the country and integrated with technical information of respective species. Based on these herbaria information, a web based software application namely “Digital Herbarium of Medicinal and Aromatic Plants in India” was developed and is available at <http://www.dmapr.org.in:8080/dhmap/Home.jsp> for public access^[3] (Fig.1).

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DIGITAL HERBARIUM OF MEDICINAL & AROMATIC PLANTS IN INDIA

Welcome aris

Home Page Add New Record Database Search Logout

Detail Record

Botanical Name:	<i>Commiphora wightii</i> Arnott. (Bhandari)
Common Name:	Guggal
Family:	Burseraceae
Used:	Oleo-gum resin - treatment of arthritis and obesity.
Collector:	Dr S.Mani
Hindi Name:	Guggal
Sanskrit Name:	Devdaru
Distribution:	Africa, Asia, Australia etc.
Habit:	Shrub with corked and knotty branches.
Others:	Click here for other information
Image:	

Fig. 1: Technical data of digital herbarium

2.2 Digital Photo Library of M&AP:

Digital Photo Library of medicinal and aromatic plants is a collection of plant specimens of medicinal plant photographs. ICT application on digital photo library of M&AP was developed to digitalize the medicinal plants photographs database collected from all over India using several advanced software techniques. It is having high quality photographs of different species of medicinal and aromatic plants.

The software application was developed using “Microsoft Front Page 2000”, “Microsoft Visual Basic Scripting Language” and “Java Scripting Language”. This package allows the user to view the available images. Using this application package one can identify and validate images available in this package. The system has the unique feature for searching the photographs by giving test related to scientific name of the species^[4].

2.3 References information system on M&AP:

A reference information system on medicinal and aromatic plants (MAPRIS) was developed to store and retrieve information of medicinal and aromatic crops literature. A large number of invaluable literature which had been published by researchers since 1955 are available in the form of hardcopy are used for the development of this database. The software tool was developed using ‘Microsoft Visual C++’ as front-end and ‘MS Access’ as back-end with user friendly menu. The system enables to add new data, delete unwanted data, update existing data and retrieve information on the selected parameters with conditional queries. The database would provide a great support to the researchers and students involved in medicinal and aromatic plants and industry by providing relevant authenticated information published in this sector from a standalone platform.

2.4 Networking of herbal gardens in India:

A web based network of herbal garden in India was developed to maintain the most common and important species of medicinal plants and provide information from 119 herbal gardens and facilitate the exchange of planting material. The network provides access to the common people about the information of herbal gardens of India. The site is available at <http://www.herbalgardenindia.org>.

Data on herbal gardens were collected from individual herbal gardens maintained by various governments and non-government organizations of India through the help of National Medicinal Plant Board (NMPB) and different state forest departments. The database contains the information about the species viz., species name, common name, number of plants available in each species, planting material availability etc., maintained in the respective herbal gardens. In the database, species were classified based on the plant habit, viz., tree, shrub, herb and climber^[2].

2.5 Open Access Journal of M&AP:

Medicinal and Aromatic Plants Association of India (MAPAI) was started in 2008 and housed at DMAPR. It was formed with the aim to promote research on MAPs, create general interests and facilitate interaction among researchers working on MAPs by providing a forum for the exchange and dissemination of knowledge and experiences related to MAPs in the form of an Open Access scientific journal^[8]. The society is engaged in publishing a journal named Open Access Journal of Medicinal and Aromatic Plants (OAJMAP) with ISSN 0974-7877 and is freely available at <http://epubs.icar.org.in/ejournal/index.php/JMAP> (Fig.2).

Fig. 2: Open Access Journal of M&AP

3. CONCLUSIONS

The advantage of digital delivery of key information was harnessed through several initiatives to promote ICT usage in research, information communication, information archiving and its dissemination. Realizing the strategic importance of ICT and the advantage of digital delivery of key information, the DMAPR has ventured into a lot of ICT related projects in

medicinal aromatic plants research. These ICT applications got a significant boost in information dissemination and have been detailed in this paper.

4. ACKNOWLEDMENT

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