

MEDICINAL AND AROMATICS PLANTS

Potential of manufacturing value-added products from aromatic plants highlighted

The Medicinal and Aromatic Plants Society of India (MAPSI), a non-profit national scientific society dedicated to medicinal and aromatic plants (MAPs) organized its second annual meet and national convention on aromatic plants and medicinal products at Indian Institute of Technology (IIT), Roorkee on January 27-28, 2009 in the picturesque ambience of Uttarakhand, a State blessed with huge biodiversity and nature's expression.

Mr. Ramakant Harlalka, Vice-President, MAPSI, in his welcome speech, pointed out that the meet was arranged to bring together progressive farmers from Uttarakhand, Maharashtra, Bihar, Uttar Pradesh, and familiarize them with the work done by research institutes involved with MAPs and to enable their interaction with industry.

Research institutes that participated in the program included the Central Institute of Medicinal and Aromatic Plants (CIMAP); The Centre of Aromatic Plants (CAP, Uttarakhand); Himalayan Institute; University of Agriculture Science (Bangaluru); Forest Research Institute (Dehradun); Kumaon University; Pantnagar University; and the National Bureau of Plant Genetic Resources (NBPGR).

'Cultivate to ensure long-term sustainability'

The opening ceremony was performed by Acharya Balkrishna, the founder of *Patanjali Yogpeeth*, which is involved in the application of MAPs in ayurvedic products on a large scale at Divya Pharmacy and Patanjali Ayurved Ltd., both located in Haridwar.

In his address, the Acharya emphasized the role of medicinal plants in curing health through the sense of smell by giving an example of the *Sanjivani buti*. Quoting an incident from the *Ramayan*, the Acharya said Laxman was cured by inhaling aromatic plants, brought down from the Himalayas by Hanuman. "Inhalation (smell) is a very important property of medicinal plants, which can be used to cure many diseases of mankind," he noted.

The Acharya also emphasized the importance of ensuring long-term sustainability of plants, which are becoming rare, through large scale cultivation. This will not only provide employment to farmers, but also ensure availability on a commercial scale for healthcare purposes.

'Convert information into knowledge with help of science to become prosperous'

In his Presidential address, Dr. Suman P.S. Khanuja, President, MAPSI, pointed out that information alone cannot take India to the forefront and make it an industrious and prosperous country. "For this to happen," he said, "we need to convert information into knowledge with the help of science, which would lead us to prosperity."

He stressed the need to move forward from a "static to a dynamic mindset." "We are victimised by laziness and tend to rest on our laurels and achievements. For example, it has crept into our mindset that Uttarakhand is blessed with huge biodiversity and is a storehouse of a rich variety of herbs,



Dr. Sundariyal, Director, HRDI lighting the lamp to inaugurate the conference. Others in picture: Acharya Balkrishna, Patanjali Yog Peeth; Dr. Hema Lohani, CAP, Selaqui; and Dr. S.P.S. Khanuja, President, MAPSI

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medicinal and aromatic plants and so we are prosperous State,” he opined.

“If we have to become prosperous, we need not only cultivate medicinal and aromatic plants, but also convert them into useful value-added products with the help of scientific knowledge. Only then can we move towards being prosperous,” he added.

Sustainability and affordability

Referring to quote by the former President of India, Dr. A.P.J. Abdul Kalam: “We do not want a developed India, we want a prosperous India,” Dr. Khanuja pointed out that there is a difference between development and prosperity. “While development is visible through progress made in infrastructure, such as flyovers, roads etc., prosperity is not visible.”

He urged attendees to make India prosperous by following the adage, ‘Healthy India, Prosperous India.’ “We need to become healthy not only physically, but in our minds, as well, by adopting clean and environment-friendly technolo-



Dr. S.P.S. Khanuja, President, MAPSI addressing the audience

gies. If we follow on this path, prosperity is bound to come.”

Dr. Khanuja also urged the audience to keep affordability in mind while moving towards this direction. “While developing new products, we need to keep in mind that we develop products that are not out of reach of the common man. If they are, it will not serve the purpose of moving the nation towards prosperity. Let us work on technologies that would be able to help us make products that would be affordable, at the same time sustainable, so that we do not ex-

haust our resources, but conserve them for future use.”

Experts from research institutes who made interactive presentations at the meet included:

- Dr. Sundariyal, Herbal Research Development Institute, Gopeswar;
- Dr. Dinesh, CIMAP;
- Dr. Hema Lohani, CAP;
- Dr. Upadhyay, Himalayan Institute;
- Dr. Kaushal, Patanjali Yog Peeth;
- Dr. Mathela, Kumaon University;
- Dr. Vasundhra, UAS, Bangaluru;
- Dr. Sanathan, Forest Department, Uttarakhand;
- Dr. V. Varshney, FRI, Dehradun; and
- Dr. Schloss, Israel (Use of essential oils in healthcare).

A brainstorming session was held with Dr. Prakash Narayan, Givaudan, Bangaluru, as Chairperson and experts from industry and academia.

Mr. Ramakant Harlalka also made a video presentation on the MAP industry, research and plantations in Uttarakhand.

INSTITUTE FOCUS

Forest Research Institute, Dehradun: Paving the way for development of the essential oils industry

Dr. V.K. Varsney, Scientist, Chemistry Division, Forest Research Institute (FRI), Dehradun presented a paper on “Forest derived essential oils — Glimpses of research,” which gave an account of the research work carried out at FRI.



The activities of FRI include forestry research, training and extension, forest education and scientific services. Research is carried out in silviculture, forest products, botany, entomology, pathology, chemistry and extension, forest soil & land reclamation, resource sur-

veys & management, non-wood forest products, cellulose & paper, ecology and environment, genetics & tree propagation etc.

The main thrust of research activities is to develop technologies for:

- Enhancement in forest productivity;
- Improvement of planting stock;
- Rehabilitation of wastelands;
- Efficient utilisation of wood and non-wood forest products; and

- Development of eco-friendly products and processes.

Chemistry Division

The goals and objectives of the Chemistry Division, founded in 1906 with Mr. Puran Singh as first Branch Officer, include:

- Pioneering research in chemistry of forest products for their utilization and promotion;
- Phytochemical investigation and value-addition for efficient utilization of non-wood forest products, wood, waste products from forestry operations and forest-based industries;
- Isolation and identification of chemical constituents;
- Development of technologies for value-addition;

- Disseminating up-to-date scientific information; and
- Providing technical services to the Government, academia and industries.

The division is currently engaged in research in essential oils, natural dyes, medicinal plants, biopesticides, oils and fats, gums and resins, *katha* and cutch, tannins, cellulose and starch.

Focus on essential oils

Efforts are also being made to isolate and characterize essential oils from a number of species. In the past, the institute has paved the way for the establishment of large scale industries for manufacture of sandalwood oil, gum turpentine and gum rosin. The

institute has also developed Indian Standard specifications for essential oils of lemongrass, eucalyptus, sandalwood, vetiver, cinnamon leaf, camphor, clove, geranium, citronella, peppermint, palmarosa, gingergrass, rosin and turpentine.

The institute is also recognized as the 'National Referee Testing Laboratory' for gum rosin and is the repository of its primary standards for duplication and issue to trade and industry.

It published a monograph on 'Aromatic Plants of India' jointly with the Essential Oils Research Committee of the Council for Scientific and Industrial Research (CSIR) in 16 parts, covering 53 families of aromatic plants.

INSTITUTE FOCUS

Herbal Research and Development Institute: Acting as vital link between farmer and market

The Herbal Research and Development Institute (HRDI), is an autonomous institution of the Uttarakhand Government and the nodal agency of Uttarakhand Medicinal Plants Board. It has its headquarters at Gopeshwar (Chamoli) and a Centre of Aromatic Plants (CAP) at Selaqui, Dehradun. It is dedicated to conservation, development and sustainable utilization of MAPs in Uttarakhand.

According to Mr. Nirpendra K. Chauhan, CAP, the Himalayan region of Uttarakhand having different agro-climatic conditions is rich in phyto-diversity. The flora of the area has a large number of species, which have been identified as valuable



aromatic plants. Keeping in view the availability of these diversified aromatic plants in abundance and the

possibility of growing a number of exotic aromatic plants from other tropical areas, the CAP was established in 2003 as a unit of the HRDI, under the Horticulture Department, Govt. of Uttarakhand.

Sustainable use of aromatic plants

The Centre aims at the betterment of inhabitant through research & extension based advocacy of sustainable use of aromatic plants. The objectives of CAP include promotion of cultivation, processing, quality assessment and develop market linkages for aromatic plants & products. Its mission is to achieve economy oriented sustainable use of aromatic flora of the State and to get the State recognized as quality producer of products, by encouraging cultivation and processing of aromatic crops.

It promotes pre-, post-harvest and

extraction technology to improve yield and quality of oils; provides facilities for quality certification; focuses on research to foster efficient industry development; and aims to improve the flow of information to farmers and industries.

Quality planting material, distillation units and training to operate these are provided. So far, 28 field distillation units have been installed in clusters in the State. A quality testing laboratory, having facilities such as GC, GC-MS, HPLC, HPTLC, FTIR, Polarimeter, UV-Spectrophotometer etc., has been established at Selaqui, Dehradun. A revolving fund of Rs. 50-lakh for 'on-the-spot' payment to farmers for oils they produce has been created to help needy farmers market their produce.

The Centre has been successful in motivating about 7000 farmers for cultivation of aromatic plant in about 685-hectares of land since its establishment in 2003. At present farmers are growing crops like lemongrass,

citronella, mint, artemisia, damask rose, *kala jeera*, chamomile, *tejpat* etc. More than 4200 farmers have been given training.

SCFE unit in PPP mode

The Centre is also working on a public private partnership (PPP) based model. Under this initiative, India Glycols Ltd., Kashipur, has set up a supercritical fluid extraction (SCFE) unit at Selaqui, with technical inputs from CAP. The raw material is directly purchased from farmers by IGL for extraction, which is expected to boost production of quality produce in the State. IGL has also signed an MoU with Shankubaba International, Hardwar for ensuring a market for the produce.

CAP also foresees the possibility of finding new essential oils and aroma chemicals from the abundant, but as yet unexplored or under-explored aromatic plants. The major components of some important species of aroma-bearing crops are:

- *Cupressus torulosa*: Sabinene (24.5%), α -pinene (16.6%) and DL-Limonene (12.9%);
- *Cymbopogon distans*: DL-Limonene (13.0%), L-bornyl acetate (11%);
- *Perilla frutescens*: 2-Allyl-4-methylphenol (11.3%), cuminic aldehyde (9.5%);
- *Chenopodium ambrosioides*: β -Terpinene (44.7%), cymene (21.3%), ascaridole (17.9%);
- *Lantana camara*: Germacrene-D (13.4%), trans-caryophyllene (12.0%);
- *Artemisia vulgaris*: β -Thujone (11.4-25.0%), terpinene-4-ol (2.2-5.9%);
- *Eupatorium cannabinum*: p-Cymene (22.8%); and
- *Artemisia maritima*: 1,8-Cineole (23.1%) and chrysanthenone (25.2%).

These can be used as new source for fragrances, flavors and aromatherapy.