

Doon University and Society for Conservation and Resource Development of Medicinal Plants (SMP), New Delhi are jointly organizing A National Conference on “Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits” at Dehradun, on 21-23 March, 2014, in order to bring into focus the rich medicinal plant diversity of Uttarakhand and the northern part of India.

In the proposed conference we can discuss and make recommendations to the concerned Government Agencies to bioprospecting, conservation and sustainable use of medicinal plants resource of the region.

A great deal of traditional knowledge by the use of various plant species is still intact with the indigenous people. Since this area is well known for its diversity of forest products and the age-old healthcare traditions, there is an urgent need to establish these traditional values in the national perspectives realizing the ongoing developmental trends.

Apart from health care, medicinal plants are mainly the alternate income-generating source of underprivileged communities; therefore, strengthening this sector may benefit and improve the living standard of rural and forest communities.

This Conference would help to bring together researchers, administrators, policy makers, companies manufacturing herbal medicinal products, traders, herbalists, media persons, NGOs and social activists on a common platform to initiate meaningful dialogue and promote exchange of knowledge and facilitate cross fertility of ideas relating to sustainable management of medicinal plants and promoting marketing networks and conservation strategies with involvement of all stakeholders

**National Conference  
on  
Environmental Constraints, Conservation and  
Resource Development of Medicinal Plants for  
Health and Societal Benefits**

**March 21-23, 2014**

**ORGANISING COMMITTEE**

***Patrons***

Professor V.K. Jain  
Dr. P.P. Bhojvaid

***Co-Patrons***

Dr. D.C. Uprety  
Professor A.R. Nautiyal  
Dr. U.S. Rawat  
Dr. A. Arunachalam

***Convener***

Professor Kusum Arunachalam

***Treasurer***

Shri Ashok Datta

**Jointly Organized by**



**Doon University, Dehradun  
and**



**Society for Conservation and Resource  
Development of Medicinal Plants  
New Delhi**

**Sponsored by**  
National Medicinal Plants Board  
New Delhi

National Conference on Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits, 21-23 March 2014, Doon University, Dehradun

### **Executive Committee**

**Chair** : Prof. A.K. Bhatnagar, Delhi

---

**Co-Chair** : Prof. Rana Pratap Singh, Lucknow  
Dr. G.P. Rao, IARI, Delhi

**Programme Secretary** : Prof. A.R. Nautiyal, Srinagar, Uttarakhand

### **Advisory Committee**

## **Working Committees**

- 1. Registration**
- 2. Editings and Proceedings**
- 3. Accommodation and Transport**
- 4. Technical Session**
- 5. Food and Catering**
- 6. Press and Publicity**

## **7. Decoration and Venue Management**

---

### **Production**

D Reema

Society for Conservation and Resource Development of Medicinal Plants

A-155, Ashok Vihar, Phase-IV, New Delhi - 110 052, India

Ph. : 0-8802467671, e-mail : daffodil.reema@yahoo.com

National Conference on Environmental Constraints, Conservation and Resource Development of  
Medicinal Plants for Health and Societal Benefits, 21-23 March 2014, Doon University, Dehradun

---

## **Doon University**



## **Society for Conservation and Resource Development of Medicinal Plants (SMP)**

Society for Conservation and Resource Development of Medicinal Plants (SMP) has been established in 2007 and has been functioning with aims and objectives of :

- (a) to constitute a forum at international and national level for bringing together individuals and organizations involved in medicinal crops;
- (b) to develop international research/development linkages and disseminate up-to-date technologies in the field of medicinal plants and their cultivation, standardization through rapid information system;
- (c) to promote and undertake research and development and extend services in the field of medicinal crop plants;
- (d) to explore new areas to medicinal crop cultivation technologies, development activity and logistic management;
- (e) to propagate utilization on non-conventional and renewable sources of medicines from natural plant sources and devices in herbal industry for medicinal plants products processing including extraction of active ingredients and products of medicinal importance;
- (f) to develop purely organic package for growing and cultivation of medicinal crops;
- (g) to develop technology of in vitro propagation of important medicinal plants;
- (h) to offer recognition and awards to professional groups and individuals for attainment of excellence in the field of medicinal crops and related industries;

- (i) to interact with government agencies, scientific organization and NGOs to promote and protect interests of medicinal crop growers and producers;
- (j) to organize symposia, seminars and workshops, and bring out timely publication(s) to meet the objectives of the research.

The society has also been publishing an international journal “Medicinal Plants” covering all aspects of medicinal crop cultivation, medicinal uses of plants, their active ingredients and related industries. The Journal is being published quarterly since 2009 and the volume 5 No. 3, 2013 is in progress. This journal promotes the interdisciplinary exchange of knowledge and ideas in medicinal plant crops and related industries. The journal is unique of its kind as there is no other journal available which covers all aspects of medicinal plant crops and related industries. This journal is an official publication of Society for Conservation and Resource Development of Medicinal Plants. The journal is planned with every aim to provide a high profile vehicle for publication of the most innovative, original and rigorous development in research and industry. To set the standards, interdisciplinary studies of fundamental problems on the subject are given high priority. The structure of the journal takes into account the broad scope of R&D in medicinal plant crops research and industry. Thus in addition to its full length and short papers on original research, the journal also includes regular features on editorial, review articles, meetings, scientific correspondence, medicinal plant crop and industry news, current references on the subject from other sources and book reviews.

Society for Conservation and Resource Development of Medicinal Plants  
A-155, Ashok Vihar, Phase-IV, New Delhi - 110 052, India  
Ph. : 011-27305018, 0-9818412122  
e-mail : [smediplants@yahoo.com](mailto:smediplants@yahoo.com); [www.smediplants.com](http://www.smediplants.com)

National Conference on Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits, 21-23 March 2014, Doon University, Dehradun

---

## **Technical Program**

---

**August 25, 2013**

---

9.00 AM – 10.30 AM : National Conference on Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits, 21-23 March 2014, Doon University, Dehradun

National Conference on Environmental Constraints, Conservation and Resource Development of  
Medicinal Plants for Health and Societal Benefits, 21-23 March 2014, Doon University, Dehradun

---

---

---

## **Technical Session - 1**

---

---

**Unraveling the hidden potential of medicinal plants native to Uttarakhand region using Bioinformatics tools**

Shaifali Goyal\* and Kumud Pant

Dept. of Biotechnology, Graphic Era University, Dehradun (U.K.)  
India

**\*Corresponding author:** shaifalig8@gmail.com

Medicinal plants are known to provide the best human medicine since ancient times. Indigenous people use them even today for curing themselves from various diseases, and have far more knowledge, and familiarity with the plants, their nature, habitat and uses. They are mostly present at higher altitudes like Himalayas. Uttarakhand is known to be the herbal state due to its rich biodiversity, and herbal traditions, and from where most of the known marketed plant-based drugs come, and used against various diseases among humans ranging from fever to diabetes, cancer, etc. Since plants produce secondary products or metabolites like flavonoids, camalexins, alkaloids, etc, they serve as potential targets against these diseases. In contrast, the young generation considered to be the pool of knowledge is unaware and lack this valuable information of our natural plants. The reason behind could be the lack of work on identification of the medicinal plants due to difficulties in their availability, descriptions, local names and uses. New technologies prove useful for the purpose like bioinformatics and chemi-informatics which can be accessed easily as they are publicly available on the internet. Bioinformatics is a field which can be more fruitful generating results more easily and quickly, since it can be cheaper and less labor intensive technique. It will help researchers in Uttarakhand to unravel the hidden information of the plants and bringing Uttarakhand at par with other states and also with the world. For this reason, tools like mirbase are used to identify hidden or unknown miRNAs, the hot topics of the century to cure various devastating diseases. Docking these sites with the available

plant information on ESTs, GSSs, and protein sequences, may help in developing potential drug candidates against various diseases, and against bacterial, and viral proteins that may affect or alter various processes in the human body. Modern tools and ‘-omics’ technologies can help in understanding as well as unraveling the nature and biological effects of the medicinal plants. This field holds promise for developing new therapies against ravaging diseases. The main reason behind focusing more on plant-based drugs are their low cost, less side-effects and public acceptance being the major of all. The challenge is to identify natural compounds which when on various combinations can be used against human diseases.

**Key points:** Medicinal plants, Uttarakhand, Bioinformatics, Diseases.

***For Young Scientist Award for poster presentation***

**Antimicrobial Studies of leave extracts from *Desmodium heterocarpon***

**Arora Shefali<sup>a</sup>Yadav Vandana<sup>a</sup>and Kumar Deepak<sup>b</sup>**

***<sup>a</sup>Department of chemistry, University of petroleum and energy studies, Dehradun (UK) India.***

***<sup>b</sup>Department of pharmaceutical chemistry, Dolphin (PG) Institute of biomedical and natural Sciences, Dehradun (UK) India.***

***e-mail: [shefali.arora@ddn.upes.ac.in](mailto:shefali.arora@ddn.upes.ac.in), [jollydcy@yahoo.co.in](mailto:jollydcy@yahoo.co.in)***

The title and author information are:

**Antimicrobial Studies of leave extracts from *Desmodium heterocarpon***

**Arora Shefali<sup>a</sup>Yadav Vandana<sup>a</sup>, Kumar Pankaj<sup>a</sup>and Kumar Deepak<sup>b</sup>**

***<sup>a</sup>Department of chemistry, University of petroleum and energy studies, Dehradun (UK) India.***

***<sup>b</sup>Department of pharmaceutical chemistry, Dolphin (PG) Institute of biomedical and natural Sciences, Dehradun (UK) India.***

***e-mail: [shefali.arora@ddn.upes.ac.in](mailto:shefali.arora@ddn.upes.ac.in), [jollydcy@yahoo.co.in](mailto:jollydcy@yahoo.co.in) Phone no. +91-9411724290***

**Abstract**

In the recent years, the interest in medicinal plants has increased in a great deal. Presently a complete website regarding the ayurvedic medicinal plants is nowhere available in the net. It's a humble attempt to fulfill this gap. *Desmodium* is a genus in the flowering plant family Fabaceae, sometimes called tick-trefoil, tick clover or beggar lice. Several *Desmodium* species contain potent secondary metabolites. *Desmodium* are generally useful as living mulch and as green manure, as they are able to replenish soil fertility due to their nitrogen fixation and good animal fodder. Some *Desmodium* species were shown to contain elevated amounts

of tryptaminealkaloids and having various pharmacological activities. In continuation of this, we are trying to investigate the antimicrobial studies of *Desmodiumheterocarpon*.

Successive extraction of the crushed leaves of the plants has been done with methanol solvent. These extract was tested for their antimicrobial activity against the bacterial strains of *Escherichia coli*, *Klebsiellapneumoniae*, *Salmonella typhi*, *Bacillus subtilis*, *Staphylococcus aureus* and the fungal strains of *Aspergillusniger*, *Penicilliumchrysogenum*, *Saccharomyces cerevisiae*, *Candida albicans*. The results have shown that methanol extract showed very good activity against *Salmonella typhi* bacterial strains and excellent activity against all the fungal strain viz. *Aspergillusniger*, *Penicilliumchrysogenum*, *Saccharomyces cerevisiae*, *Candida albicans* as it showed more inhibition zone than the standard drug ketoconazole.

Keywords: *Desmodiumheterocarpon*, Antibacterial activity, Antifungal activity.

## UTILIZATION OF AQUATIC MACROPHYTES FOR SEWAGE TREATMENT

**Uday Bhan Prajapati, and Shyam Singh**

Department of Botany

Mahatma Gandhi Post Graduate College, Gorakhpur – 273001

E-mail : [prajapatiuday@rediffmail.com](mailto:prajapatiuday@rediffmail.com)

Abstract:

In the last three decades the population of the Gorakhpur city has increased rapidly during 1981-1991 by included 47 periurban villages and 66.7 % population growth rates occurred during the period. Approximately 70% of domestic water supplied is released as wastewater. The total waste water generated in Gorakhpur city is 65.84 MLD and it expected to be 131.20 MLD in 2025. On the basis of nature of pollutants and sensitivity of plant, three aquatic macrophytes (*Eichhornia crassipes* (Mart.) Solms, *Pistia stratiotes* L. and *Hydrilla verticillata* Casp.) were selected for the present investigation. Macrophytes based wastewater treatment system have several advantage compared to conventional treatment system i.e. low operating cost, low energy requirement, they can often be established at the site where the wastewater is produced. Conventional processes for removal of metals from industrial wastewaters include chemical precipitation, oxidation-reduction, electrochemical techniques and membranes based separation technique. These processes are expensive when metals are found in relatively moderate concentrations, such as 1 - 100 mg/L. Biological methods such as bioaccumulation strategies for the removal of metals ions may provide an attractive alternative to existing technologies. The development of Phytoremediation technologies for the cleanup of contaminated site is purely plant based and use of plant's natural ability to contain, degrade or remove toxic chemicals and pollutants from soil and water. Therefore plant can be introduced into and environment and allowed to absorb contaminates into leaves and roots. Phytoremediation is a cost effective and echo-friendly strategy, which can compliment or replace conventional approaches.

**Keywords:** Urbanization, Peri-urban, Sewage, Phytoremediation and Aquatic Macrophytes

### **Medicinal and Protective Role of Vegetables**

UDIT KUMAR, MANOJ RAGHAV, and <sup>1</sup>GIRISH CHANDRA

Department of Vegetable Science, <sup>1</sup>Department of Seed Science and Technology,

College of Agriculture, G.B.P.U.A. & T. Pantnagar, U.S. Nagar-263145 (Uttarakhand)

Corresponding author email-

*udit\_74@rediffmail.com*

#### **ABSTRACT**

A balanced diet alone may not be able to protect from diseases due to polluted environment or other factors. The food enriched with protective elements will certainly well over medicine. The evidences are accumulating that people who habitually consume diet high in plant foods have lower risks of coronary heart diseases, non insulin dependent diabetes and cancers of the colon, lung, stomach etc. Vegetables contain less content of fiber but are of better quality than fiber of bread etc. and responsible for bringing down the incidence of colon cancer with multiple mode of action. Recent studies show that flavonoides play important role in cancer chemoprevention. Flavonoids reported to inhibit enzymes such as prostaglandin synthase, lipoxigenase and cyclooxygenase closely related to tumorigenesis. The common flavonoids present in vegetables are quercetin, duteolin, kaempferol and myricetin. Capsicum contains highest amount of total flavonoids (10-850 mg/Kg) and quercetin (10-780 mg/Kg), the other vegetables like onion (280-490 mg/Kg), kale (110 mg/Kg), broccoli (30 mg/Kg) and French bean (30-45 mg/Kg) and good flavonoid contents. Kale have good amount of kaempferol. It may also prevent activation of carcinogens. The preventing activity of flavonoids is due to their antioxidant activity. Carotenoids and vitamin C also reported to prevent cancerof lungs and other organs. The medicinal role of vitamin C may in part lies in its scavenging action of free radicals. In a recent study, it was indicated that yellow orange vegetables and dark green vegetables are more protective than â-carotene. They also found the protective effect of lycopene (a carotenoid) against prostate cancer. The cruciferous vegetables contain high amount of glucosinolates

that lower the incidence of cancer by detoxifying carcinogens. Vegetables contain low amount of fat, high potassium ion concentration (lower the blood pressure) and soluble dietary fiber. These factors have been attributed for their preventive role in cardiac disorders.

Dr. UDIT KUMAR  
Assistant Professor  
Department of Horticulture  
Rajendra Agricultural University  
PUSA, BIHAR-848125  
Mo- 8057234266

Dear Sir/Madam

I am herewith submitting an abstract entitled ‘ SAMRIDDHI: A NOVEL PRODUCT FROM MEDICINAL WEEDS FOR UPLIFTMENT OF SILKWORM FARMERS LIVELIHOOD’ by Rashmi and Pankaj Tiwari for its **oral presentation** in the category of ‘**Young Scientist Award**’. Kindly acknowledge the receipt and acceptance of the same.

The registration fee will be submitted very soon.

Thanking you

With Best Regards

Dr. Rashmi

Scientist

Chemistry Division

Forest Research Institute

Dehradun

Ph: 09412318839

**SAMRIDDHI: A NOVEL PRODUCT FROM MEDICINAL WEEDS FOR UPLIFTMENT OF SILKWORM FARMERS LIVELIHOOD**

**Rashmi and Pankaj Tiwari**

Chemistry Division, Forest Research Institute, Dehradun,

Regional Sericulture Research Station, Central Silk Board, Shashpur, Dehradun

E-mail: [rashmi@icfre.org](mailto:rashmi@icfre.org)

**Abstract:**

Some weeds are reported to have the insect growth regulatory effect (hormonal) on growth, development and uniform maturation in silkworm without any adverse effect on economic traits. Juvenile Hormones Analogue (JHA) developed for control of pest in past were synthetic and costly. It is lethal when administered in higher dose, but in lower concentration it regulates the physiology of insects. This gave the idea of utilizing phytohormones to control physiological processes of *Bombyx*

*mori* L., a silk secreting insect of high economic value.

In Uttarakhand sericulture is subsidiary occupation. Only two crops are being practiced by the sericulturist of the area. Rearers are facing the problem of shortage of leaf quality and quantity during V stage of silkworm larvae, which leads to poor harvest of cocoons, resulted in low returns to the farmers. These problems are mainly due to adverse effect on the physiology of the silkworm and can be dealt through regulation in the physiological process.

By keeping the above problems and facts in the mind, an economic product was developed for the silkworm farmers under a joint venture with Regional Sericulture Research Institute, Sahaspur, Dehradun. After a continuous and arduous effort of 7 years of research and extensive trials in laboratory as well as in the field, a novel product named as '*Samriddhi*' was developed. The application of '*Samriddhi*' reduced the cost of silk production in terms of mulberry leaves, manpower days, infrastructure and time besides giving a good quality and quantity of silk. The product will give an edge to the farmers in terms of competitiveness, financial gain and economic upliftment. Training cum awareness programmes for farmers about the product were also organized in different villages of Dehradun district.

**Environment Friendly Green Technology for Phytoremediation of toxic metals**

J.S. Negi, A.K. Bhandari, V.K. Bisht and H.R. Arya

Herbal Analytical Laboratory, Herbal Research and Development Institute, Mandal, Gopeshwar - 246 401, Uttarakhand, India

\*Author for correspondence: E-mail: negijs@yahoo.com

**Abstract**

Metals are prevalent in the environment. They are derived from both natural and anthropogenic sources. Certain metals are essential for plant growth, animal and human health. However, if present in excessive concentrations they become toxic. Degradation of organic contamination by microbial bioremediation has been proofed, but it is ineffective for toxic metal contamination. The toxic metal contamination can only be remediated by removal from soil and water. The use of certain green plants to remove the contamination from the environment is termed as phytoremediation. This technique is being developed as a potential remediation solution in US. Soil and water contaminated with toxic metals creates major environmental and human health problems. Therefore, there is a need of an effective and affordable technological solution. Phytoremediation is an emerging technology that employs the use of higher plants for the cleanup of contaminated environments. Fundamental and applied researches have unequivocally demonstrated that selected plant species possess the genetic potential to remove, degrade, metabolize or immobilize a wide range of contaminants. Hyperaccumulator plants accumulate high levels of essential micronutrients and also absorb significant amounts of nonessential metals. The phytoremediation of metals is a cost effective environment friendly green technology based on the use of metal accumulating plants to remove toxic metals, including radionuclides from soil and water. Extensive research is needed to find out phytoremediator plants for removal of toxic metal from environment.

**Keyword:** Hyperaccumulation, **Phytoremediation, toxic metals**

Yours Sincerely,

Dr. J.S. Negi

Sr. Pr. Scientist, Herbal Analytical Laboratory/

Nodal Officer, National Mission on Medicinal Plants Uttarakhand,  
Herbal Research and Development Institute (HRDI), Mandal, Gopeshwar-  
24640, Uttarakhand, India  
Telefax: 01372 254273, 10 (O); 09997239903, 09927737907 (M),  
E mail: jagmohansinghnegi1981@gmail.co

## IMPORTANCE OF MEDICINAL PLANTS IN DRUG DISCOVERY

<sup>1</sup>Pankaj Kumar\*, <sup>2</sup>Anupama Singh and <sup>3</sup>Girish Chandra

<sup>1,2</sup> Research Scholar, Genetics and Plant Breeding, GBPUA&T, Pantnagar, 263145, Uttarakhand

<sup>3</sup> Research Scholar, Seed Science and Technology, GBPUA&T, Pantnagar, 263145, Uttarakhand

Email-[vaidya.pankaj4@gmail.com](mailto:vaidya.pankaj4@gmail.com)

### ABSTRACT

Plants have been utilized as medicines for thousands of years. Majority of the population in developing countries depends on traditional system of medicine for their primary health care. Due to this magnification trend towards the use of alternative system of medicine, natural medicinal plant resource in this world is under enormous pressure. Several Institutions, Organizations, Universities, Pharmaceutical Industries across the world have been engaged in research and documentation of various aspects of the medicinal plants to frame a strategy for their conservation and sustainable utilization. Although the drug discovery from medicinal plants continues to provide an important source of new drugs leads to numerous challenges are encountered, including the procurement of plant materials, the selection and implementation of appropriate high-throughput screening bioassays and the scale-up of active compounds. These medicines initially took form the crude drugs such as tinctures, teas, poultices, powders and other herbal formulations. Drug discovery from medicinal plants led to the isolation of early drugs such as *cocaine*, *codeine*, *digitoxin* and *quinine* in addition to morphine, of which some are still in use. *Turmeric* is an important part of Eastern cultural traditions, including traditional Chinese medicine and Ayurveda. The curcumin the pigment that gives turmeric its yellow-orange color is responsible for many of turmeric's medicinal effects, which stretch far beyond the potential to fight cancer. In fact, in India people refer to turmeric as

“holy powder” because it has such a broad range of health effects. The curcumin has been shown to influence more than 700 genes, with benefits. Medicinal plants have been widely used to treat a variety of infectious and non-infectious ailments. According to one estimate, 25% of the commonly used medicines contain compounds isolated from plants. In India more numbers of medicinal plants used as different daily purposes in one of which, Spices for food like *Black pepper*, *Cumin*, *ginger*, *garlic*, *turmeric*, *basil*, *anise*, *capsicum*, *fennel*, *citrus* and *mustard* etc. these spices medicinal values have been discovered. The key properties of anticancer herbs are enhance antioxidant enzymes, inhibit cancer-associated inflammation, inhibit pro-inflammatory cytokines, attack tumor directly, Induce apoptosis, Modulate autocrine loops & cell cycles, Inhibits angiogenesis, Neutralize carcinogenic toxins, Inhibit telomerase, Inhibits hormone-dependent tumors and Enhances chemotherapy/radiotherapy. The local areas of Uttarakhand (Kumaun and Garhwal region) number of medicinal plants are using every day. The turmeric (Haldi) and *Cyanadon dactylon* (Doob ghaas) used as a medicine for wounding in animals and humans. The fresh turmeric tubers and green *Cyanadon dactylon* grinds together and the moist solid mixture of this, to put on the wound which is very effective for animals particularly for hens. The fresh turmeric mix with milk, after drinking it is very effective for prevent the blood clotting in case of internal wound. Medicinal plant drug discovery continues to provide new and important leads against various pharmacological targets including cancer, HIV/AIDS, Alzheimer's, malaria, and pain. Besides, the innumerable social benefits, much emphasis on medicinal value of the plants. *Mentha* (mint or pudina) is a well-known genus (Lamiaceae) for medicinal and aromatic value. The genus *Mentha* includes 25-30 species that are under cultivation from tropical to temperate climate of America, Europe, China, Brazil and India etc. India fulfils 80% of total global demand with production of 16,000 tons of mint oil. Antimicrobial potential of *Mentha piperita* oil in liquid and vapour phase against different bacterial strains (*Pseudomonas aeruginosa*, *Pseudomonas fluorescens*, *Bacillus subtilis* and *Staphylococcus aureus*), fungal strains (*Penicillium digitatum*,

*Aspergillus flavus*, *Aspergillus niger*, *Mucor spp*, and *Fusarium oxysporum*) and yeasts (*Candida albicans* and *Sacchromyces cerevisiae*). The basic biological information is needed to guide the rapidly accelerating commercialization process, especially for the selection of superior plants, the development of new cultivars and the standardization of raw materials.

## **Medicinal Worth Wild Fruits Plants**

**Anita Tomar, Ashutosh Kumar and Kumud Dubey**

Centre for Social Forestry and Eco-rehabilitation, Allahabad

**(A Centre of Forest Research Institute, Dehradun)**

Corresponding author: anitatomar@icfre.org

The use of wild plants by human as a source of food is in practice since time immemorial. During early civilization, before agriculture was practiced, man lived by hunting and fruit gathering collected from the wild. As such, most tribals still depend on wild fruit bearing plants for food, medicine and nutritional supplement.

Wild edible fruits can contribute significantly to the nutrition of rural inhabitants. Although these fruits can be consumed by people throughout the year in fresh and dried forms, reliance on these edible fruits increases during periods of cereal shortages. Wild edible foods include fruits, leaves, flowers and seeds from spontaneous trees and shrubs. Of these, fruits are receiving increase interest on wild edible plant species because of their nutritional value, vitamin and mineral contents.

There are many wild edible fruits plants in the state of Uttarakhand and Uttar Pradesh which are unknown despite their nutritional values therefore, to explore the better utilization wild fruits species of medicinal value a present check list has been compiled from the observation made by the authors as well as reports in literature. Some of the striking examples are *Artocarpus heterophyllus*, *Artocarpus lakoocha*, *Aegle marmelos*, *Averrhoa carambola*, *Annona squamosa*, *Berberis aristata*, *Carissa carandus*, *Cordia dichotoma*, *Euphoria longan*, *Eugenia jambos*, *Ficus roxburghii*, *Ficus palmate*, *Ficus auriculata*, *Grewia subinaequalis*, *Feronia limonia*, *Juglans regia*, *Manilkara hexandra*, *Moringa oleifera*, *Morus indica*, *Myrica esculenta*, *Pithecolobium dulce*, *Spondias mangifera*, *Scleichera oleosa*, *Syzizium cumini*, *Tamarindus indica*, *Ziziphus mauritiana*, etc

In the present paper 35 wild fruits plants with different medicinal value belonging to 27 families are dealt with. There is a need to conduct scientific studies on such neglected species of medicinal and commercial values.

**Keywords: wild fruits, neglected species, medicinal, commercial**

**Impact of seed priming application of gibberellic acid on growth, biochemical, yield attributes and protein status of chickpea (*Cicer arietinum* L. cv. DCP 92-3)-an antidiabetic pulse**

**Mohd Mazid**

**Advanced Plant Physiology Section, Department of Botany, Faculty of Life sciences, AMU, Aligarh-202002**

**Abstract:**

A pot experiment was conducted at a net house of the Department of Botany, Aligarh Muslim University, Aligarh in the 'rabi' (winter) season of 11<sup>th</sup> October, 2009 to 26<sup>th</sup> March, 2010 to evaluate the effects of gibberellic acid (GA) on growth, physio-biochemical, yield and quality parameters of chickpea cultivar DCP 92-3. Surface sterilized seeds of chickpea (*Cicer arietinum* L.) were soaked in four concentrations viz., 0, 10<sup>-7</sup>, 10<sup>-6</sup> and 10<sup>-5</sup> M aqueous solution of GA for 4, 8, or 12 h and sown in pots with sandy loam soil. The potted plants were then analysed at 90 and 100 days after sowing (DAS) for shoot length and shoot dry weight per plant, leaf number, leaf area (LA) per plant, net photosynthetic rate ( $P_N$ ), stomatal conductance ( $g_s$ ), leaf chlorophyll content (Chl), carbonic anhydrase (CA) activity. The pod number per plant, seed yield per plant and seed protein content was estimated at harvest. All parameters were found to be significantly enhanced by the seed priming application of different levels of GA, with maximum stimulation being noted following a 8-h soaking treatment with 10<sup>-6</sup> M GA. Moreover, the mentioned parameters were enhanced by 69.33%, 139.66%, 58.87%, 68.79%, 250%, 106.04% and 87.06% respectively over the control at the 90 DAS stage except  $P_N$ . The pod number per plant and total seed protein content were stimulated by 82.69% and 54.32% respectively except seed yield per plant.

**Key Words:** Dry weight, Leaf area, net photosynthetic rate, stomatal conductance, leaf chlorophyll content, carbonic anhydrase, seed yield, seed protein content

**Abbreviations:** GA, gibberellic acid; DAS, days after sowing; LA, leaf area;  $P_N$ , net photosynthetic rate;  $g_s$ , stomatal conductance; Chl, chlorophyll; CA, carbonic anhydrase

**Prospects of *In-situ* Conservation of *Rhododendron arboreum* – a medicinally important plant species in the temperate region of Garhwal Himalayas**

**H.B. Vasistha, Mridula Negi, Mukesh Prasad\*, and Shyam**

Division of Forest Ecology and Environment,  
Forest Research Institute, Dehradun-248006, Uttarakhand.

**\*Corresponding Author: prasad.mukesh16@gmail.com**

**Abstracts**

*Rhododendron arboreum* is an important plant in Himalayan region with extensive medicinal and commercial uses. The plant exhibit anti-inflammatory, hepatoprotective, anti-diarrhoeal, antidiabetic, antioxidant properties due to presence of flavonoides, saponins, tannins and other phyto-chemicals. In recent years its flowers are being extensive used for preparation of squash throughout the region of Uttarakhand. Being a higher medicinal and other uses of this species there is a need to sustain the population of this species. Therefore study was conducted to find out the impact of different habitat conditions on the natural regeneration of the *R. arboreum* in the part of Garhwal Himalaya. Result obtained from the study reveal that best regeneration of the species occur in the open canopy cover, where it was more than 45 % and soil was exposed and loose. The regeneration of seeds inside the dense forest having thick canopy cover was not adequate while the road side regeneration showed quite good. When soil is exposed to some form of disturbances such as trenching, road construction, and human disturbances, it loosens the surface of the soil that provides a good substratum for the seed to germinate. In open canopy cover the seed get optimum amount of sunlight that required for their photosynthesis which leads to growth. In case of dense forest the thick layer of litter make it difficult for seeds to directly contact with surface of soil, with that it get lower chance germination. The present study suggested that small trenches and open canopy should be made to enhance the natural regeneration of *R. arboreum* in dense canopied forest and thereby to promote the in- situ conservation of thin species.

**Key words:** *Rhododendron arboreum*, Regeneration, Seed germination

## Oral presentation

### **Traditional uses of medicinal tree species in Renukaji area, western Himalaya**

Vinod Kumar Yadav\*, Laxmi Rawat  
Forest Ecology and Environment Division,  
Forest Research Institute, Dehradun.  
E-mail: [vinu932@gmail.com](mailto:vinu932@gmail.com)

Himalayan forests are the most important source of medicinal plants, which are used by local people. Renuka Forest Division (RFD) lies in Sirmaur District of Himachal Pradesh in western Himalaya between 77° 17' 34" to 77° 47' 38" E longitudes and 30° 52' 16" to 30° 31' 11" N latitudes. It is situated in the outer western Himalayan region. The geographical area of the division is 1018 km<sup>2</sup> and forest area is of 273.65 km<sup>2</sup> (26.88% of the total area). Reserved forest and protected forest covers are 244.64 and 28.43 km<sup>2</sup>, respectively. The entire tract is mountainous and varies in elevations from 620 to 3647 m msl. The slopes are generally steep to precipitous with deep khalas and springs. The entire region of Renukaji falls within the catchments of Giri, Sainj and Tons rivers.

The present study is focused on the traditional use of medicinal trees in the study area. Information on medicinal trees of the present study has been gathered through questionnaire survey and also from relevant literature. A total of 30 medicinally important tree species were reported viz., *Rhododendron arboretum* (Burans), *Terminalia bellirica* (Bahera), *Pinus roxburghii* (Chir) etc. Out of which 30% trees were used for their bark, about 27% fruit part of trees were used, about 17% leaves, 10% both roots and seeds were used by local people.

The present study documents the traditional uses of medicinal tree species of Renukaji area. This study can serve as baseline information on medicinal trees and could be helpful in conservation of this important resource of the area.

## **SIGNIFICANT QUALITY AND CONSERVATION OF MEDICINAL PLANT**

**<sup>1</sup>Himani, <sup>2</sup>Hemant Sahu,**

Department of Genetics and Plant Breeding, G. B. Pant University of Agriculture and Technology,

Pantnagar - 263145, U. S. Nagar, Uttarakhand

1, M.Sc Scholar Genetics and plant Breeding GBPUA&T., Pantnagar

2, Ph.D Scholar Genetics and plant Breeding IGKV, Raipur (Chattisgarh)

E-mail: [himanipantgpb@gmail.com](mailto:himanipantgpb@gmail.com)

### **ABSTRACT**

Medicinal plants have been identified and used throughout human history. Many plants produce special substances in their roots, leaves, flowers, or seeds that help them to survive. Since earliest times, people have gathered these substances to create herbal medicines to treat certain diseases. When a plant is designated as 'medicinal', it is implied that the said plant is useful as a drug or therapeutic agent or an active ingredient of a medicinal preparation. Medicinal plants may therefore be defined as a group of plants that possess some special properties or virtues that qualify them as articles of drugs and therapeutic agents, and are used for medicinal purposes. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions. Many of these phytochemicals have beneficial effects on long-term health when consumed by humans, and can be used to effectively treat human diseases. These phytochemicals are divided into (1) primary metabolites such as sugars and fats, which are found in all plants; and (2) secondary metabolites – compounds which are found in a smaller range of plants, serving a more specific function.

Medicinal plant conservation strategies need to be understood and planned for based on an understanding of indigenous knowledge and practices. Many drugs contain herbal ingredients, and it has been said that 70–80% of the world's population relies on some form of non-conventional. Due to the rapid degradation and loss of natural habitats, juxtaposed

with the over harvesting of some species, much of the biological wealth that is so intrinsically important to traditional systems of medicine has been destroyed or become endangered. Today, there is an urgency to conserve India's medicinal plants. Conservation of medicinal plants in its biocultural perspective not only implies conservation of biodiversity but also places an equal emphasis on conservation of cultural diversity. The use of plants as medicines predates written human history. Ethnobotany (the study of traditional human uses of plants) is recognized as an effective way to discover future medicines. In 2001, researchers identified 122 compounds used in modern medicine which were derived from "ethnomedical" plant sources; 80% of these have had an ethnomedical use identical or related to the current use of the active elements of the plant.<sup>[4]</sup> Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine, and opium.

Use and diversity in medicinal plants-In India, of the 17,000 species of higher plants, 7500 are known for medicinal uses. This proportion of medicinal plants is the highest proportion of plants known for their medical purposes in any country of the world for the existing flora of that respective country. Ayurveda, the oldest medical system in Indian sub-continent, has alone reported approximately 2000 medicinal plant species, followed by Siddha and Unani. MPCN members have made considerable progress in the conservation of medicinal plants, via community participation activities. The in situ conservation programme initiated by the network is reported to be the most cost-effective way of conserving inter and intra specific diversity of medicinal plants. Around 1500 species of medicinal plants, including 76 Red-listed species, are being conserved in and outside their natural habitats. The medicinal plants conservation efforts are being initiated in Maharashtra and Andhra Pradesh.

In conclusion, plants have provided humans with many of their essential needs, including life-saving pharmaceutical agents. Recently the World Health Organization estimated that 80% people worldwide rely on herbal medicines for some aspect. There are more than 270,000 higher plants

existing on this planet. But only a small portion has been explored phytochemically. As a vast proportion of the available higher plant species have not yet been screened for biologically active compounds, drug discovery from plants should remain an essential component in the search for new medicines & the scientific study of traditional medicines, concerned medicinal plants are important.

### Solanaceous Crop: An Important Medicinal Vegetable

<sup>1</sup>Girish Chandra, <sup>2</sup>Manoj Raghav, <sup>2</sup>Udit Kumar and <sup>3</sup>Pankaj Kumar

<sup>1</sup>Department of Seed Science and Technology, <sup>2</sup>Department of Vegetable Science,

<sup>3</sup>Department of Genetics and Plant Breeding, College of Agriculture, G.B.P.U.A. & T. Pantnagar, U.S. Nagar-263145 (Uttarakhand)

Corresponding author's

email- *girishctiwari24@gmail.com*

#### Abstract

In terms of health benefits vegetables are king. The Solanaceae family is characteristically ethnobotanical, that is, extensively utilized by humans. Solanaceous vegetables have sown to protect oesophageal, gastric and prostate cancers. Antioxidant potential of tomato is due to presence of antioxidant bio molecules such as lycopene, ascorbic acid, phenols flavonoids and vitamin E. flavonoids antioxidant inhibit the cancer cells growth and may help to prevent hypertension. Lycopene is the principle pigment conferring red colour to fruit can be considered as the vitamin of 21<sup>st</sup> century because of its physiological effects on human diet. The phenols antioxidant inhibits the production of carcinogens. Brinjal is reported to stimulate the intrapetic metabolism of blood cholesterol. Leaf and fruit, fresh or dry produce marked drop in blood cholesterol level. The de-cholesterolizing action is attributed to the presence of poly-unsaturated fatty acids *i.e.* linoleic and lenolenic acid which are present in flesh and seeds of the fruit in higher amount (65.1%). Chillies may prevent: cancer, heart disease, stroke, blood clots, obesity, high blood pressure, high cholesterol, bronchitis, emphysema, coughs and colds and stomach ulcer. It is used as a food, a spice and an herbal medicine for over 9,000 years, chillies are said to be good for the kidneys, spleen, pancreas, lungs and heart. In Victorian England, chillies were prized for their warming properties in treating arthritis, chills, rheumatism, sprains and depression. About 12% of chilli is comprised of capsaicin, the compound that makes it taste hot and this is where most of chilli's medicinal properties come from. The pungency in chilli is due to an alkaloid capsaicin which has high medicinal value. Capsaicin has many medicinal properties, especially as an anti-cancerous agent and instant pain reliever. It also prevents heart diseases by dilating blood vessels.

## **Oral Presentation**

### **Ethno-Medicinal & Ethno-Veterinary Practices in Nanda Devi Biosphere Reserve, Uttarakhand**

Jaiyati Rawat\*, Archana Sharma, Laxmi Rawat & Ruchi Badola

The Himalayas have a great wealth of medicinal plants and associated traditional knowledge on health care. The Indian Himalayas alone endorse over 18000 species of plants out of which nearly 45% are considered to have medicinal properties. Our knowledge of medicinal plants has mostly been inherited traditionally. Use of plants for curing various ailments are not only confined to the doctors but is known to several households as well. Disseminating and upholding this knowledge on medicinal plants and their uses has become important for human existence. Thus, this paper explores the range and distribution of traditional knowledge of the local people in context to the use of wild edibles and other medicinally important plants species for ethno-medicinal as well as ethno-veterinary purposes. Information of about 55 species belonging to 32 families having medicinal, cultural and religious relevance was collected from the local people. The study documents the traditional knowledge, utilization aspects and distribution of ethno-botanical knowledge of the local people of 8 villages under NDBR region, as a step towards sustainable utilization and conservation of medicinal plant species. Information given by the people about the medicinal plants can provide an interesting ethno-botanical data and the distribution of ethno-botanical knowledge indicated that much of the germane ethno-botanical and utilization information was held by more aged members of the society. Hence, there is an absolved need to capture this knowledge before it is bewildered such that it can contribute to the knowledge of younger generation regarding the importance and need of preservation of the resource use.

### **Conservation of Some Ethnomedicinal Rare, Endangered and Threatened (RET) plants**

**Shiv Mahendra Singh and Anita Tomar**

Centre for Social Forestry and Eco-rehabilitation, Allahabad

**(A Centre of Forest Research Institute, Dehradun)**

Corresponding author: *shivmahendra82@gmail.com*

There are many Rare Endangered and Threatened (RET) species whose population are fast decreasing indicating them as threatened for future but the need of the hour is to take some effectual steps to tutelage the vanishing phytodiversity coupled with the preparation of “Green Data Book” instead of increasing the list of threatened and endangered plant species in “Red data Book” continuously.

Generally 6000 plants are becoming endangered annually due to several factors like habitat specificity, narrow range of distribution, land use disturbances, introduction of non-natives, habitat alteration, climatic changes, heavy livestock grazing and explosion of human population and genetic drift of natural enemies. For most rare and endangered plants, the best method for their conservation is to establish their germplasm garden.

For the present study some ethnomedicinal RET plants of Uttarakhand and Uttar Pradesh viz. *Berberis spp.* (Rare), *Gentiana kuroo* (critically endangered), *Mahonia jaunsarensis* (Indeterminate), *Catamixis baccharoides* (vulnerable), *Ulmus wallichiana* (Endangered), *Trachycarpus takil* (Endangered nearly extinct), *Rauvolfia serpentine* (Endangered), *Acorus calamus* (vulnerable), *Celastrus paniculatus* (critically endangered), *Gloriosa superba* (critically endangered), *Andrographis paniculata* (Vulnerable) and *Costus speciosus* (endangered) belonging to different families are categorized and dealt with. Rarity categorization of plants is based on Nayar and Sastry (1987, 1988, 1990), Samant *et al.* (1998), Dhar *et al.* (2002), Red Data Book (Walter and Gillett, 1998) and IUCN.

In the present study protocol has been developed for their cultivation. Biodiversity of all these species need to be conserved. Establishment of

germplasm garden can be one such way to save them from extinction in near future. Scientifically much more work is required to be carried out on RET plants, which are facing various degrees of threat. Conservation needs are exceptionally urgent and of paramount importance to preserve this heritage for posterity. It is expected that study in this field will open new frontiers on the relatively small amount of work on conservation of rare endangered and threatened plants.

**Keywords:** Germplasm, rare, endangered, threatened, vulnerable, biodiversity, extinction

Oral presentation

**Development of Ecofriendly Natural Dyes from Areal Biomass of *Perilla frutescens* for Textile Colouration**

**Anita Pal, Rakesh Kumar and Y.C. Tripathi**

**Chemistry Division, Forest Research Institute, Dehradun – 248006  
INDIA**

[anita.doon@gmail.com](mailto:anita.doon@gmail.com); [colourrakesh@gmail.com](mailto:colourrakesh@gmail.com); [tripathiyc@gmail.com](mailto:tripathiyc@gmail.com)

**Abstract**

*Perilla frutescens* (L.) Britt. (Lamiaceae), a copious herb of Uttarakhand state is primarily acclaimed as traditional medicine. The herbaceous stems of the plant are a traditional antidote for morning sickness and leaves taken internally are said to prevent flue, bronchitis, asthma, constipation, rheumatism and numerous other ailments. It is also used for sunstroke, inducing sweating and to reduce muscle spasms. Pharmacological studies have revealed its anti-allergic, anti-tumor and anti-oxidant properties. Perilla seed oil owing to its rich nutrient composition in terms of omega-3 fatty acid and alpha-linolenic acid is valued as nutritious edible oil. The present study envisaged producing practicable natural dyes from areal biomass of *Perilla frutescens* for textile coloration considering the environmental constraints of synthetic chemicals and remarkable resurgence of global interest in non-toxic ecofriendly natural products.

Natural dye was extracted from the dried and powdered areal parts with optimized conditions that resulted in substantial and economically viable yield of natural dye. Operating conditions were first optimized for extraction of natural colourant. Extraction of natural dye was attempted under different operating parameters including material to liquor ratio (2.0 – 16.0 gm/100ml), pH (9.0– 10.0) and time (15 – 75 min.). The critical values of concentration, pH and time were found to be 15.5gm/

100ml, 9.75 and 45 minutes respectively. The yield of natural dye obtained with critical operating conditions was recorded to be as high as 12.9%. Extraction of dye with optimized conditions has the superiority over conventional methods in term of yield, quality and procedural efficiency, thus making the entire production process time and cost effective. The study thus holds immense significance in advantageous production of natural dyes and establishing *P. frutescens* as a potential source of non-toxic, non-hazardous and ecofriendly textile dye of commercial grade. In view of the enormous commercial potential of *P. frutescens* as raw material for several industrial products including ecofriendly textile dye coupled with its immense medicinal importance, the plant species needs promotion and deserves particular attention towards conservation, sustainable utilization and resource expansion for health and societal benefits

**Key Words:** *Perilla frutescens*, Process optimization, Natural dye, Conservation, Resource development

## **CURRENT TRENDS IN CULTIVATION AND INDUSTRIAL PROCESSING IN MEDICINAL PLANTS**

\*

**RENU<sup>1</sup> AND SARVJEET<sup>2</sup>**

<sup>1</sup>Department of Horticulture

(G. B. Pant University of Agriculture & Technology)

Pantnagar-263145 District: Udham Singh Nagar, Uttarakhand

<sup>2</sup>Department of Genetics & Plant Breeding

(N. D. University of Agriculture & Technology)

Kumarganz-224229 District: Faizabad, U. P.

\* (E Mail Address: renukaurmidhas@ gmail.com)

### **ABSTRACT**

Throughout the ages, humans have relied on nature for their basic needs for the production of food-stuffs, shelters, clothing, means of transportation, fertilizers, flavours and fragrances, and, not the least, medicines. Plants have formed the basis of sophisticated traditional medicine systems that have been in existence for thousands of years and continue to provide mankind with new remedies. At present, medicinal plants still play an important role in both developed and developing countries in Asia. In addition, they also generate income to the people of many Asian countries who earn a living from selling collected materials from the wild or through their own cultivation. Asia has abundant species of medicinal and aromatic plants as it has high cultural diversity, diverse ancient civilizations and abundant raw material for modern drug manufacturing. According to the World Health Organisation (WHO), As much as 70 per cent of India's population use traditional medicine. The collection and processing of medicinal plants and plant products are a source of both full and part time employment in the country. Microstudies suggest that a large number of those employed in this sector are women. Medicinal plants are one of the most important components of the non-wood forest products sector which supplies over 80 per cent of India's

net forest export earnings annually, according to World Health Organisation (WHO). The international market of herbal products is estimated to be US \$ 62 billion which is poised to grow to US \$ 5 trillion by the year 2050, but India's share in the global export market of medicinal plants related trade is just 0.5 per cent. This indicates that production, consumption and domestic and international trade in medicinal plants based products is going to grow at a significant rate. For making full use of this potential, India must develop scientific cultivation, post harvest technology, processing, manufacturing, research and extension, patenting and marketing for medicinal plants. Though economic importance of medicinal plants is well known, it is considered as a forestry sub-sector (nontimber forest products) in India. There are about 45,000 plant species (nearly 20 per cent of the global species) are found in the Indian Subcontinent. Among these about 3,500 species of both higher and lower plant groups are of medicinal values. Of around 500 medicinal plant species used by the contemporary *Ayurvedic* industry, around 80 per cent are procured from wild areas, mostly notified as forest land. Medicinal plants procured from cultivated private fields account for ten per cent of the total medicinal plants in active trade. Cultivation of medicinal plants at the farm level is one of the interventions being focused and tried to meet their ever increasing demand. The crucial point is that all medicinal plants cannot be cultivated because of their agro-climatic requirement specificity. Further, the effect of agro-climatic conditions on the chemical composition and therapeutic properties of medicinal plant species are well recognised and documented in Ayurveda. Seasonal variation and age has a bearing on the composition of drugs. These factors limit the number of medicinal plants which are amenable for cultivation and extent to which it can be cultivated. On the other hand, technology and institutional arrangements influences which species are preferred for cultivation and who are going to grow them. Given these facts, there is an urgent need to assess priority species for future planning. The Scientific Advisory Committee on Herbal Products has recommended that the government should focus attention on cultivation and marketing of 45 medicinal plants over the next 20 years.

As the medicinal plant industry blooms into a billion dollar business, it reaches beyond collection, propagation, harvesting and sale of crude vegetal drugs into product formulation, packaging and dispensing of sophisticated phyto-pharmaceuticals and herbal preparations. The scientific study of these medicines and the systematic uplifting of the industry to preserve the ancient and serve the modern is now the global challenge. Industrial processing has been taken place by use of various products which is related to the various medicinal and aromatic plants (MAPs) in different countries. About 90% of global essential oil production is consumed by the flavor and fragrance industries. This is mostly in the form of cosmetics, perfumes, soft drinks and food. The largest consumer of essential oils is the USA, followed by western European countries like France, Germany and the UK, and Japan. Approximately 3000 plants are used for their essential oils, with 300 of these being commonly traded on the global market. In the conventional pharmaceutical industry, pharmaceutical companies produce medicines from compounds extracted from plant material, or use plant derived compounds as starting material to produce drugs semi-synthetically. More than 25% of the pharmaceutical drugs used in the world today are derived from plant natural products. Medicines are produced to high standards and must undergo clinical evaluation of safety and efficacy. Clinical trials have been performed for many herbal medicines and for the most part it is known which constituents are responsible for the medicinal effect. Phytopharmaceutical medicines are standardized in terms of the active constituents. Examples of popular phytopharmaceuticals are Ginkgo biloba extract to improve cognitive function, St. John's Wort for treatment of mild depression, ginseng as general tonic and cognitive enhancer, ginger against nausea and vomiting and saw palmetto for the treatment of symptomatic benign prostatic hyperplasia. Plants used as raw materials for industry are supplied in two ways, through collection in the wild and via cultivation. Each of these methods of supplying plant material has advantages and disadvantages. For the pharmaceutical and other medicinal industries, cultivated plant material is preferred as it is easier to control

the whole supply chain and chemical variation will be less. With the use of cultivated plants, problems such as adulteration or misidentification of material, is mostly eliminated. It is also easier to adhere to quality standards and have less batch-to-batch variation as the plants are grown under controlled conditions. A more reliable supply of raw material is also probable and the price of the material will be more stable than with wild collected material purchased on the open market. The disadvantages of cultivation are that the raw material is usually more expensive than wild harvested plants, since investment is required before production can start and during the cultivation process. Thus the medicinal plant industry puts together the various facets of this multi-disciplinary industry and its global interest. It discusses the dire need for developing countries to acquire technologies and techniques for programmed cultivation of medicinal plants. It addresses a wide variety of topics including the old philosophies, modern impact of traditional medicines, and methods of assessing the spontaneous flora for industrial utilization. It covers aspects of cultivation and climatic variations, biological assessment and formulation, process technologies, phytochemical research and information sources.

**Antidiabetic activity guided Isolation and Characterization of New Hypoglycaemic Diterpenoid From *Azadirachta indica* Leaves.**

**Authors Name:** Alok Maithani\*<sup>1</sup>, Versha Parcha<sup>1</sup>, and Geeta Joshi<sup>2</sup>.

**Organization Address:** 1. Department of Chemistry, Sardar Bhagwan Singh (PG) Institute of Bio-Medical Sciences & Research, Balawala, Dehradun.

2. Department of Chemistry, Bidla Parisar, HNBG Central University, Srinagar Garhwal.

**Mode of Presentation:** Poster

**E-mail:** alok\_maithanii@rediffmail.com

**Objective:** *Azadirachta indica* is a tree in the mahogany family Meliaceae. It is evergreen but under severe drought it may shed most or nearly all of its leaves. The branches are wide spread. For thousands of years the beneficial properties of Neem have been recognized in the Indian tradition. Therefore, present study was aimed to isolate and characterize the active constituent which exhibits antidiabetic activity in *A. indica* leaves. **Material & Methods:** Chemicals like petroleum ether, chloroform, acetone, methanol, DI water, butanol, silica gel G- for column chromatography (# 200 – 400), ethyl acetate, and silica gel G for TLC, were used for extraction and isolation work. Spectral study of compound was done with UV-Vis (UV-250, SYSTRONICS), FT-IR(SYSTRONICS), <sup>1</sup>HNMR & <sup>13</sup>CNMR (Bruker Avance II 400 NMR ), mass spectrometer (ThermoFinnigan, LCQ, USA). Pharmacological activity was performed in albino rats of wistar strain. Diabetes was induced by alloxan monohydrate and blood glucose level was evaluated by GOD – POD method. **Result:** Treatment given to the diabetic rats i.e., administration of glibenclamide and AB3 for a period of 15 days cause a significant reduction (p<0.05) in FSG levels. AB3 produces 56.37% reduction in FSG while glibenclamide caused 63.79% reduction in FSG in diabetic rats. **Conclusion:** The spectral data and qualitative test suggest AB3 is a diterpenoidal compound with structural similarity to Margalonone except an additional hydroxyl group in AB3. Hence the hypoglycemic effect of *Azadirachta indica* leaf is due to the presence of compound AB3.

## **Anthropogenic pressure reduced population size of medicinal and aromatic plant species in western Himalaya, India**

R.S. Chauhan\*

Biodiversity and Applied Botany Division, Indian Institute of Integrative Medicine (CSIR), Canal Road, Jammu 180 001, Jammu and Kashmir, India

\*Present address: Veer Chandra Singh Garhwali (VCSG) College of Horticulture, Uttarakhand University of Horticulture & Forestry, Bharsar-246 123, Pauri, Uttarakhand, India E mail- [rchauhanua@gmail.com](mailto:rchauhanua@gmail.com)  
Phone no.- **91 94567 38061**

### **Abstract:**

Anthropogenic pressures had been defined as important factors that allow the maintenance of species diversity. Medicinal and aromatic plant species (MAPs) are badly affected with anthropogenic pressure and number of such species is increasing as rare endangered and threatened (RET) plants. Convention on biological diversity (CBD) had adopted a target of reducing the rate of biodiversity loss, but the factors responsible for such loss are not assessed properly in most of the areas. Population survey was carried out on few such species in their natural habitats in western Himalaya, India. Vegetation sampling was conducted through vertical belt transect method in the areas of occurrences of the selected species using quadrat method. Anthropogenic factors e.g. grazing and destructive harvesting are major threat for population reduction in most of the selected species in study sites. Factors responsible for population reduction and methods for their conservation are discussed. Such rare, endangered and threatened MAPs should be conserved through both *in situ* and *ex situ* methods.

**Keywords:** Anthropogenic factors, Biodiversity conservation, Medicinal and aromatic plants, Population decrease, Western Himalaya

## STUDIES ON EFFECT OF SHADE ON OCIMUM SANCTUM

*Khushboo Srivastava, Fatima Ali, Namita Singh, Akanksha Devi,  
Dr. H.S. Chauhan*

CSIR- Central Institute of Medicinal and Aromatic Plants, Department of Soil and Agronomy, Lucknow.

Climatic change has become increasingly recognized as one of the greatest challenges to humankind and all other life on earth. The productivity of plants is greatly affected by various environmental stresses. The objective of our work was to investigate the effect of shading on the growth and development of *Ocimum sanctum*. The different varieties taken were OB-2, OB-4, IB-10, IB-11, TJ-9 and CIM-Saumya. Seedlings were maintained under 4 different light treatments namely full sunlight vs. shade treatments like 35%, 50%, and 75%. After 60 days of cultivation, plant height, stem diameter (sdm), petiole length, total leaf area, specific leaf area, and leaf weight ratio and oil yield ratio were measured. The shade grown plants were taller in comparison with those grown in full sunlight. We found the best result in 50% shade in comparison to other two shades. Also the pests like aphids and whiteflies attacked the plant but the CIM- Saumya variety was resistant towards these pests.

**Keywords:** *Ocimum sanctum*, CIM-Saumya, sunlight, shade, pests.

## Oral

### STUDY OF PHYSICAL PARAMETERS FROM THE IMMATURE GREEN, MATURE GREEN, COLOUR INITIATOR AND FULLY RIPE STAGES OF *DIOSPYROS PEREGRINA*

Deepika Chauhan\* and P. K. Gupta

Cellulose and Paper Division

Forest Research Institute, Dehradun - 248006

Email: [cdeepika07@yahoo.com](mailto:cdeepika07@yahoo.com)

#### Abstract

*Diospyros peregrina* Gurke. (Ebenaceae) is an evergreen tree upto 15 m high grows all over India especially in the plains of coastal regions and river banks in India. Unripe fruits are astringent, acrid, bitter and oleaginous. Unripe fruits are used for the treatment of diarrhoea, dysentery, cholera, ulcer of mouth, and in wounds. Mature fruits are highly nutritious and contribute to household food security of rural people.

*Diospyros peregrina* fruits are used for making jams, jellies, osmodehydrated slices and squash. Products like sweet chutney, dried pieces, milk shake, nectar, blended drinks, pickle, preserve and candy can also be prepared with good sensory quality. Even wine can be prepared from *Diospyros* fruit. Ripening stage of fruit affects physical parameters of fruit which ultimately affects the quality of processed products prepared from them. Hence, an experiment was undertaken to study the effect of different stages of ripening on physical parameters of *Diospyros* fruits.

From the present study, it is concluded that, physical parameters viz. weight of fruit, pulp, skin and seed, volume of fruit, specific gravity, length and diameter of fruit, fruit colour, pulp: seed ratio and pH of *Diospyros* fruits could be considered as maturity indices to judge the ripening stages of *Diospyros* fruit for various value added products preparation.

**Keywords:** Physical parameters, *Diospyros peregrina*, Different stages.

**Thiobarbituric acid assay of different plant parts of *Euryale ferox* Salisb. at different time interval**

**Nidhi Gupta\*, A.K. Srivastava and V. N. Pandey\***

Experimental Botany and Nutraceutical Laboratory

Department of Botany

DDU Gorakhpur University,

Gorakhpur-273009.

E-mail: nidhig.ddu@gmail.com

Abstract:

Antioxidant activity in different plant parts of *Euryale ferox* Salisb was investigated by using Thiobarbituric acid assay. The thiobarbituric acid radical scavenging (TBARS) assay in *Euryale ferox* Salisb. leaf, mature sun dried seeds and popped seeds varied in the range of 71% to 82.3%. The rate of TBARS inhibition was highest in mature sun dried seeds (82.3%) followed by leaves 74% and popped seeds 71%. The TBARS activity increases gradually for initial four days but becomes limiting afterward. The conclusion drawn from this study indicates that different plant parts of *Euryale ferox* possess strong TBARS activity and may act as strong antioxidant.

Key words: Antioxidant activity, plant parts, thiobarbituric acid assay.

**Quantitative estimation of phytochemicals in ripe fruits of *Flacourtia jangomas* (Lour.) Raeusch**

Neeharika Dubey and V.N.Pandey

Experimental Botany and Nutraceutical Laboratory, Department of Botany, DDU Gorakhpur University Gorakhpur (UP)-273009

neeharika.dubey5@gmail.com

**Abstract**

*Flacourtia jangomas* (Lour.) Raeusch [Family: Flacourtiaceae] is a very important nutraceutical fruit crop of North- Eastern Terai region of U.P. The present study includes the quantitative analysis of some phytochemicals viz. phenols, flavonoids, alkaloids, tannins and saponins in the ripe fruits of *F. jangomas* collected from the Botanical garden of DDU Gorakhpur University. The data reveals that the amount of alkaloid present in the fruits of *F. jangomas* is 254 g/g, flavonoid 250 g/g, saponin 320.00 g/g, tannin 8.00 g/g and total phenol was 3.4 g TA. The conclusion has drawn from this study shows that ripe fruits of *F. jangomas* are very important source of phytochemicals and antioxidants.

**Keywords:** phytochemicals, antioxidants, nutraceutical, *Flacourtia jangomas*.

Dear Sir/Madam

I am herewith submitting an abstract entitled 'A HERBAL BIOPESTICIDE FROM MEDICINAL PLANT FOR SHISHAM DEFOLIATOR' by K.P. Singh and Rashmi for its oral presentation in National Conference on "Environmental Constraints, Conservation and Resource Development of Medicinal Plants for Health and Societal Benefits" at Dehradun, Uttarakhand on 21-23 March, 2014. Kindly acknowledge the receipt and acceptance of the paper so that registration fee may be submitted.

Thanking you

yours faithfully

Dr. Rashmi

Scientist

Chemistry Division

FRI, Dehradun

### **A HERBAL BIOPESTICIDE FROM MEDICINAL PLANT FOR SHISHAM DEFOLIATOR**

K.P. Singh and Rashmi

Entomology Division, Chemistry Division, Forest Research Institute,  
Dehradun-248006

Email: singhkp@icfre.org

#### **Abstract:**

Medicinal plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and

herbivorous mammals. Integrated pest management (IPM) has been the most recent method of pest control. It is a combination of various methods being utilized in management of insect pests without disruption of the environment. Now-a-days, chemists and entomologists together are trying different new tools compatible with IPM concepts without affecting the ecosystem. These tools include the use of plant extracts, biopesticides, microbial control, pheromones and by genetic manipulation

*Calotropis procera* belonging to family Asclepiadaceae, commonly known as Madar or Aak, is a shrub widely distributed as a medicinal weed throughout India. The plant is erect, branched and perennial with milky latex. A large quantity of latex can be easily collected from its green parts. Local people use it successfully to combat some cutaneous fungal infections.

The abundance of latex (containing alkaloids) in the green parts of the plant reinforces the idea to investigate different extractives of leaves of *C. procera* for their larvicidal activities against important defoliator *Plecoptera reflexa* (lepidoptera: noctuidae) of Shisham. The 3rd instar larvae of *P. reflexa* were exposed to a wide range of concentrations (0.0625 to 2.00%) of LC50 value of each sample and control. After repeated experiments at laboratory level a *Bio-Pesticide* was developed against major defoliator of shisham. Sustained experiments in laboratory demonstrated efficacy against defoliator of shisham. The phytochemical analysis of these extracts was carried out and showed the presence of alkaloids, glycosides, saponins, proteins, terpenoids, sterols and flavonoids.

The above mentioned ***Bio-Pesticide*** will facilitate the farmers to improve their economic condition through increased production and high economic gain. It is safe and economic alternatives to the synthetic insecticides.

**Inadequate Inventorization and Documentation of Medicinal Plants:  
Constraints in Planning for Conservation Strategies**

Dr Jyoti K Sharma

*Visiting Professor*

Environmental Sciences and Natural Resources Management

School of Natural Sciences, Shiv Nadar University

Village Chithera, Dadri Tehsil, 91 NH, GB Nagar, Uttar Pradesh 203207

**ABSTRACT**

India, with its diverse agro-climatic conditions and regional topography, has been considered as the treasure house of medicinal plant genetic resources. Our herbal wealth constitutes more than 8,000 species and accounts for around 50 % of all higher flowering plant species of India; around 70 % of the medicinal plants in the country are spread across the tropical forests of Western Ghats and the rest in the Himalayas and other parts. Available information shows that 1,800 species are used in Classical Indian systems of medicines; Ayurveda uses 1,200, Siddha – 900, Unani – 700, Amchi – 600, and Tibetan – 450 plant species. Today many of these medicinal plants collected from wild face extinction or severe genetic loss due to overexploitation resulting from unsustainable harvesting regimes practiced, destructive collection techniques, etc.; the other most serious proximate threats are habitat loss to crop-based agriculture and habitat degradation due to various anthropogenic factors. Besides, there is a dramatic increase in exports of medicinal plants attests to worldwide interest in these products as well as in traditional health systems. In the last 10 years, for example, India's exports of medicinal plants have trebled. There is a short supply of many medicinal plants and hence to meet the ever increasing demand adulteration is becoming rampant. For most of the endangered medicinal plant species no systematic conservation action has been taken. Although several MPCA have been identified for conservation in different parts of the country but it is doubtful that how scientific is their selection. There is not even a complete inventory of medicinal plants in different regions of India. For sustainable utilization and conservation of medicinal plants effectively, it is vital to

know precisely which are the species concerned, what are their correct scientific and local names, and where they grow and their population structure. This information can only tell our total wealth of medicinal plants and how much to utilize and how much to conserve and where. Then only we can plan their sustainable utilization and conservation in an effective way. Several national and international agencies have formulated appropriate policies and strategies for the conservation of medicinal Plants (IUCN, UNEP & WWF, 1980) but none has addressed the inventorization and documentation. Therefore, the paper will discuss the priority areas in medicinal plants research which need to include *inventorization, documentation and population distribution mapping* besides threat categorization based on IUCN guidelines, conservation biology, propagation of rare species for reintroduction into their natural habitats and of course their agro-technology.

This abstract is for an ORAL presentation.

**Batliwalas of Udaipur's traditional knowledge in treating hair ailments using a mix of herbs with henna (*Lawsonia inermis*)**

*Sonali Bhandari*

*Shiv Nadar University, Village Chithera, Tehsil Dadri, Gautam Budh Nagar,*

*Greater Noida 203207*

*Email: Sonali.Bhandari@snu.edu.in*

Synthetic drugs are often associated with side effects and toxicity. There is, therefore, a constant search for products from natural sources. With respect to hair ailments, hair loss, dandruff, greying of hairs etc. are common problems. These may occur due to heredity, old age, lack of proper diet and nutrition, use of chemotherapeutic drugs, infections (such as worms, lice, scabies, and eczema), stress and use of cosmetic products (soaps, shampoos and hair oils).

In the current work, indigenous knowledge about traditional herbs for treating hair ailments has been collected from Batliwallas, spice merchants, of Udaipur, Rajasthan and presented. Thirteen different herbs are mixed with henna (*Lawsonia inermis*) in a given proportion and their paste is applied to hair regularly by the local women of Udaipur, Rajasthan. This herbal treatment has been found to be very effective in treating successfully various hair ailments. Detailed studies on the chemical properties of the herbal paste are being proposed. This is the first report on traditional knowledge of Batliwallas' herbal hair therapy.

***In-vitro* propagation of *Swertia chirayita* (Roxb. ex Fleming) Karsten:  
A critically endangered medicinal herb of Himalayan region**

Rajeev Ranjan Kumar, Vijay Kant Purohit, Yateesh Mohan Bahuguna,  
Keshav Chandra Gariola, P. Prasad & Anant Ram Nautiyal  
High Altitude Plant Physiology Research Centre, H.N.B. Garhwal  
University  
(A Central University), Srinagar Garhwal, 246 174 - Uttarakhand, India  
[vijaykantpurohit@rediffmail.com](mailto:vijaykantpurohit@rediffmail.com)

**Abstract**

*Swertia* is an important genus of the family Gentianaceae, distributed in the mountains of tropical Asia, Europe, America and Africa between 1200 to 3000 m asl. About 32 species of the genus *Swertia* are reported from Indian Himalayan Region (IHR), of which 16 species are found growing in northwest Himalaya. However, among all the reported species from northwest Himalaya, *Swertia chirayita* (Roxb. ex Fleming) Karsten is the preferred species for medicinal purposes with its novel medicinal properties. *S. chirayita* is used as herbal medicine for various health ailments including liver disorder, malaria, diabetes and skin disease, fever etc. Owing to the multiple uses of the species, its market demand in pharmaceutical industries has increased considerably. To fulfil the increasing pharmaceutical demand of the species in indigenous and world market, extensive collection and unscientific harvesting practice of the plants of *S. chirayita* from natural habitats is leading day by day declining populations of the species that may ultimately raise chances of its extinction. Due to importance and current status of the species, there is an immediate need to develop reliable and applicable propagation and conservation measures of the species. Therefore, development of *in vitro* propagation protocol using different explants, media types and growth hormones has been examined in present study. The leaf explants cultured on Murashige & Skoog (MS, 1962) medium supplemented with 2, 4-D were found best for producing healthy and yellowish callus after two months of culture. The healthy and yellowish callus transferred in same

medium supplemented with 6-Benzylaminopurine (BAP) and Gibberalic acid ( $GA_3$ ) produced an average of 14.0 microshoots after 1<sup>st</sup> subculture in 20 days. MS medium supplemented only BAP also showed healthy growth of microshoots. The root formation of microshoots and development of complete regeneration protocol of *S. chirayita* is in progress.

**Key words:** Critically Endangered, *In Vitro* Propagation, Murashige & Skoog, 1962, Benzylaminopurine (BAP), Gibberalic acid ( $GA_3$ ) & Conservation.

**Acknowledgements:** The authors gratefully acknowledge the Uttarakhand State Biotechnology Department (USBD), Govt. of Uttarakhand for financial support and Director, High Altitude Plant Physiology Research Centre (HAPPRC) for providing experimental facilities. Authors also thank Miss Deepti Tiwari, Vikram Singh Rawat, Jagdish Singh, Prem Singh and Durga Prasad Gairola for field survey and collection of plant material from different areas of Uttarakhand.

*Paris polyphylla* Smith: A highly valued medicinal plant of higher Himalayan region needs attention on its propagation and conservation  
**Keshav Chandra Gairola<sup>1</sup>, Rajeev Ranjan<sup>1</sup>, Vijay Kant Purohit<sup>\*1</sup> & Harish Chandra Andola<sup>2</sup>**

<sup>1</sup>High Altitude Plant Physiology Research Centre, H.N.B. Garhwal University (A Central University), Srinagar Garhwal, 246 174 - Uttarakhand, India

<sup>2</sup>Department of Natural Resource Management, Doon University, Dehradun

Corresponding email: [Vijaykantpurohit@rediffmail.com](mailto:Vijaykantpurohit@rediffmail.com)

#### **Abstract**

Himalaya is well known for its rich biodiversity with its wide range of altitudes, topography and climatic conditions. It is a rich repository of medicinal wealth, which occupies an important place in Vedic treatise. More than 800 valuable medicinally important plant species found in this part and extensively used by the locals since time immemorial for curing various diseases of humankind. Among them *Paris polyphylla* is one of the very important plant listed as vulnerable under IUCN threat category. The *Paris polyphylla* belongs to the family Trilliaceae and locally known as Satwa or Shankhjadi in Garhwal region of Uttarakhand, Singpan in Manipur, Satuwa in Nepal. It is distributed from North-West India to Myanmar; and in Nepal Himalaya, reported from west to east within an altitudinal range of 1800-3300 m asl (IUCN 2004). It is a glabrous herb, perennial in nature growing on light sandy and moist humus rich soil with full or partial shade. The rhizomes of the *P. Polyphylla* are very important due to its uses in treatment of heart disease, asthma and bronchitis. Rhizomes and its powder are also used as anthelmintic and tonic and Ethnopediatrics for diarrhoea by the local inhabitants. Reports also indicated that highly use of rhizomes of *P. polyphylla* in Chinese system of medicines as homeostasis, anti-microbial, anti inflammatory, heart and vascular malady, antifertility, spermicidal enhancement and sedative.

Therefore, the demand of its rhizome is higher in pharmaceutical

industries. To fulfil the demands of its rhizomes illegal exploitation of the species is continuously going on. Mainly Nepalese people are uprooting the plant for selling to buyers and getting high price even Rs. 4000/kg. Because of its high trade value, now peoples of the Uttarakhand region are also attracting towards the collection of *P. polyphylla*. Recently a report published in Amar Ujala News paper (Uttarakashi Edition, dated 21 October 2013), six peoples arrested with illegally collected 218 kg Satuwa (*P. polyphylla*) from wild habitats of Harshil forest range. On the basis of old literature and interaction made with local peoples, where the species was grows abundantly, till date one or two individuals are remain found growing due to such type of illegal collection. It is also proved by population survey done through quadrat method in Pothibasa (2200 m asl) area of Rudraprayag district of Uttarakhand and other reports published in different media. Illegal and heavy exploitation from natural habitats, unsustainable harvesting (over and premature-collection), cross-border trade of rhizomes, habitat destruction, overgrazing, forest-fire, and soil-erosion are not only major causes of declining populations of the *P. polyphylla* but inherently slow-growing and poorly regenerating nature of the species is also responsible for this and due to this long term survival of the *P. polyphylla* is in risk in Himalayan region.

To overcome the problem of conservation of *P. polyphylla*, the Government need to impose total ban on illegal collection or removal of planting materials from their natural populations. Since policy-makers and scientist cannot conserve the species without wider support from the local communities and government agencies particularly forest department, a multi-faceted effort is required to conserve the species, and therefore, creation of awareness among the peoples residing in the nearby areas for scientific collection and initiation of cultivation of *P. polyphylla* for fulfilling the industrial demand is needed. Keeping in view of its importance and conservation value, the large scale propagation and seedlings development through conventional as well as biotechnological approaches will be help in easy availability of planting materials and maintain its posterity for future is suggested.

**Key Words:** Conservation, Garhwal Himalaya, *Paris polyphylla*, Rhizome.

**Acknowledgements:** The authors gratefully acknowledge the Director, High Altitude Plant Physiology Research Centre (HAPPRC) for providing facilities. Authors also thank Mr. Khushal Singh, Mr. Prem Singh, Mr. Jagdish Singh and Mr. Durga Prasad for field survey and collection of information.

**Growth Performance of seedling of *Nardostachys jatamansi* (DC) under different microclimatic conditions in two different altitudes**

Vijay Kant Purohit, Keshav Chandra Gairola, Yateesh Mohan Bahuguna, M.C. Nautiyal and A.R. Nautiyal

High Altitude Plant Physiology Research Centre, H.N.B. Garhwal University (A Central University), Srinagar Garhwal, 246 174 - Uttarakhand, India

vijaykantpurohit@rediffmail.com

**Abstract**

*Nardostachys jatamansi* DC (family-Valerianaceae), commonly known as Indian Nard, spikenard or balchar, is a 10-60 cm high perennial herb found in alpine Himalayas. The species has very long history of use as medicine in Ayurveda, Homeopathy, Ethno- medicine and Indian system of medicine (ISM) to modern medicine industry which is distributed in the Himalayas from Pakistan, India (Jammu and Kashmir, Himanchal Pradesh, Uttarakhand and Sikkim) to Nepal, Tibet and China between 3300 to 5000 m asl. A rhizome of *N. jatamansi* is used in Perfumery products, Tonic, Stimulant, Laxative, Diuretic, Anti spasmodic and Stomach ache. Due to high medicinal and aromatic value, habitat degradation, biotic interferences in distribution ranges, irregular and low seed germination in nature and high mortality of seedlings at nursery stage in high as well as in middle altitude, unavailability of mass propagation methods lacking in cultivation due to unavailability of planting materials is forced to develop and standardization the agrotechnology of the species for cultivation and conservation. Therefore, the identification of a simple highly efficient and an inexpensive technology is the foremost need of the Himalayan region for raising healthy seedlings. In this connection the present study emphasis on six microclimatic conditions i.e. Shadehouse, Polyhouse, Thatch, Polypit, Polytunnel and Open beds for assessment of survival and growth performance of seedlings of *N. jatamansi* at two different locations namely Pothibasa (2200 m asl) and Tungnath (3600 m asl). Under these microclimatic conditions five months old seedlings (seedlings developed

inside the Greenhouse; 25°C Tem., 80% Humidity) were planted for survival and growth. After one and half years of observations, maximum 75% seedlings were survived under shadehouse condition at Pothibasa in comparison of lowest 35% survival in polypit and polytunnel conditions. However, more root and shoot biomass (avg. seedling weight  $2.90 \pm 0.09$  g, avg. shoot height  $8.46 \pm 0.28$  cm, shoot diameter  $2.78 \pm 0.07$  mm, Length of root  $6.56 \pm 0.24$  cm, root diameter  $2.66 \pm 0.11$  mm and avg. number of leaves  $10.80 \pm 0.91$ ) was recorded in Open condition. At Tungnath, seedling survival was also recorded maximum (80%) under shadehouse condition and at the same time polytunnel and polyhouse was found suitable for seedlings growth and biomass formation.

**Key words:-**Microclimatic conditions, Growth performance, Seedling survival, Growth, Agrotechnology, Cultivation.

**Acknowledgements:** The authors gratefully acknowledge the National Medicinal Plant Board (NMPB), Govt. of India, New Delhi for financial support and Director, High Altitude Plant Physiology Research Centre (HAPPRC) for providing experimental facilities. Authors also thank Mr. Sandeep Singh, Pankaj Pant, Miss Alka Tiwari (JRF), Vikaram Singh and Durga Prasad Gairola for field survey and collection of plant material.

*Hibiscus Rosa Sinensis* Phytoconstituents for the development of Haemoprotective Drugs

Keerti Pandey<sup>1</sup>, Akansha Jain <sup>1</sup>, Anil K. Meena<sup>2</sup>, Poonam Singh<sup>2</sup> and R. K. Singh<sup>2\*</sup>

<sup>1</sup> Amity Institute of Biotechnology, near Malhore Railway Station, Gomti Nagar, Lucknow-226028

<sup>2</sup> Division of Toxicology, CSIR-CDRI, Jankipuram Extension, Sitapur Road, Lucknow-226031

**Abstract**

Nature has been a source of medicinal agents for thousands of years and a striking number of modern drugs have been isolated from natural source, many based on their use in traditional medicines or phytomedicines. The steroids, flavonoids, tannins, reducing sugar, mucilages, anthocyanin pigment, cyanodin diglucosides, carotene, thiamine, riboflavin, and ascorbic acid constitute major classes of phytoconstituents of plants that show pharmacology activities. Pharmacological reports revealed that it is having antifertility, abortifacient, antiestrogenic, analgesic, anti-inflammatoiy, hepatoprotective, hair growth, anticonvulsant, wound healing, antidiabetic, anticancer, antioxidant, antimicrobial and antifungal properties and extensively used in the treatment of diabetes. The main phytochemicals are present in the leaves, stem and root of the plant (Tannins ,Flavonoids, Steroids ,Alkaloids , Saponins , phenols , flavonoids and proanthocyanidin ) are applied for medicinal purpose. In our laboratory, flower extract has shown promising activity of haemoprotection which will be discussed in detail in the conference.

**A molecular approach to ameliorative effects of *Dillenia indica* leaf extract on Phenylhydrazine induced hemolytic anaemia in rats**

Pooja Shukla and R.K.Singh

Division of Toxicology

CSIR- Central Drug Research Institute, Lucknow-226031

**Abstract :-**

Plants are employed as important sources as curatives in many traditional medications. *Dillenia indica* leaves have a good potential to be used as natural antioxidants. Ameliorative effect of *Dillenia indica* was investigated on hemolytic anaemia induced by Phenylhydrazine administration. Rats were treated orally with Phenylhydrazine solution for 7 days at the dose levels of 8, 10, 12 mg/kg Body Weight. Anaemia was significantly induced with a major fall in Hemoglobin, RBC, MCH, MCV, Hematocrit and MCHC. Cause was investigated as the rupturing of RBC membrane on interacting with free radicals which are produced from oxidative degradation of Phenylhydrazine in biological systems. Anaemia induced rats were administered with *Dillenia indica* leaf extracts at the dose levels of 100, 200 and 400 mg /Kg Body weight for 7 days. It was estimated that the extract administration leads to complete recovery of Phenylhydrazine induced anaemia. This occurred because of the antioxidants present in the extract administered which are 1-Dotriacontanol and BHT.

## **Pharmacological and Acute Toxicity Study of Plant *Saraca Indica***

Akansha Jain<sup>1</sup>, Keerti Pandey<sup>1</sup>, Anil K. Meena<sup>2</sup>, Poonam Singh<sup>2</sup> and R. K. Singh<sup>2\*</sup>

<sup>1</sup> Amity Institute of Biotechnology, near Malhore Railway Station, Gomti Nagar, Lucknow-226028

<sup>2</sup> Divisions of Toxicology, CSIR-CDRI, Jankipuram Extension, Sitapur Road, Lucknow-226031

### **Abstract**

Herbal medicines are the oldest remedies known to mankind. In the present scenario, the demand for herbal products is growing exponentially throughout the world and major pharmaceutical companies are currently conducting extensive research on plant materials for their potential medicinal value. The bark of *saraca indica* is used for the pharmaceutical preparations. It *contains* an estrogenic compound called ergosteron shows stimulating effect on the endometrium and ovarian tissue and is useful in menorrhagia during uterine fibroids. Flowers of this tree are used to treat cervical adenitis, biliousness, syphilis, hyperdipsia, burning sensation, hemorrhagic dysentery, piles, scabies in children and inflammation. The juice of the leaves, mixed with cumin seeds, is used for the treatment of stomachalgia flowers of *saraca indica* show antiulcer activity against gastric ulcers in albino rats. Preliminary phytochemicals analysis of *Saraca indica* leaves showed the presence of flavonoids, tannins, saponins, sterols and triterpenoids which are known bioactive principles. Acute toxicity Studies on extract of plant *saraca indica* showed the LD<sub>50</sub> of oral toxicity of all extracts to be above 2000 mg/kg b.w. in mice. So, the extracts are safe for long term administration. The effective dose is 200 mg/kg b. w.

### Effect of *Hibiscus rosa sinensis* on Blood Profile of Phenylhydrazine Treated CF Rats

Anil Kumar Meena<sup>1</sup> and R. K. Singh<sup>1</sup>

Division of Toxicology, Central Drug Research Institute, Lucknow

#### **Abstract:**

The *Hibiscus rosa sinensis* (Fam. Malvaceae) is a glabrous shrub available throughout India, the leaves, flowers and roots of the plant were found to have medicinal values. This research was focused on the haemoprotective activity of methanolic extract of *Hibiscus rosa sinensis* L. flowers against phenylhydrazine induced haematotoxicity in Charles foster rats. Haemoprotective activity of methanolic extract of *Hibiscus rosa sinensis* L. flowers was estimated by using blood of Charles foster rats and its haematological parameters were evaluated with the help of MS9 fully automated haematology analyzer. The experimental activities for the methanolic extract of *hibiscus rosa sinensis* L. Extract showed exhibited statistically significant ( $p < 0.005$ ) haemoprotective activity against Phenylhydrazine induced haematotoxicity in Charles foster rats.

In conclusion, these observations provide evidence and possible mechanism of action for the haemoprotective activity of methanolic extract of *hibiscus rosa sinensis* L. flowers. So this type of evidence may be provided by high content of phenols and flavonoids chemical constituents in the flower of *hibiscus rosa sinensis*.

***For Young Scientist Award***

**A Phytosociological Analysis of South Gujarat Forest Vegetation Types**

G.D. Bhatt<sup>1\*</sup> and S.P.S. Kushwaha<sup>2</sup>

<sup>1</sup>Department of Petroleum Engineering and Earth Sciences  
University of Petroleum & Energy Studies  
Dehradun - 248007, Uttarakhand, India

<sup>2</sup>Forestry and Ecology Department  
Indian Institute of Remote Sensing  
Indian Space Research Organization  
Dehradun - 248001, Uttarakhand, India

**\*Corresponding author:** ganeshdattbhatt@gmail.com

**Abstract**

The present study evaluates an approach for phytosociological analysis in south Gujarat forest vegetation types using stratify random sampling techniques. The total forest vegetation area covered in south Gujarat are 5492.05 km<sup>2</sup> (17.54 %) out of 31,495 km<sup>2</sup>. The maximum forest area covered by teak mixed dry deciduous forest (14.98 %) and minimum area covered by riverain forest (0.0004 %) respectively. Based on the area of forest vegetation types 157 sample plots of 31.62 m x 31.62 m was laid in different forest vegetation types of south Gujarat. The IVI was calculated in different vegetation types and highest was observed in teak mixed dry and moist deciduous forest. The economically, medicinally and RET status of different plant species was recorded using local, tribal peoples and records of Forest Department of Gujarat. The dominant families were Leguminosace (19) followed by Poaceae (13), Compositae (12), Amranthaceae (11), Malvaceae (10), Lamiaceae (09) and Rubiaceae (08) respectively. The study demonstrates integration of stratified random

sampling techniques in south Gujarat for an assessment of medicinal and economical plants.

**Keywords:** Forest vegetation types, phytosociological approach, random sampling, medicinal and economical plants

Morphological variations in broad and narrow leaf variants of *Picrorhiza kurrooa* Royle Ex. Benth, under natural and cultivated conditions

Dharam Chand and M. C. Nautiyal

*High Altitude Plant Physiology Research Centre (HAPPRC), Post Box No.14,  
HNB Garhwal University, Srinagar Garhwal - 246 174, Uttarakhand,  
India*

E-mail: dcattri13@gmail.com

Abstract

*Picrorhiza kurrooa* Royle ex. Benth (vernacular name–Kutki) belonging to the family Scrophulariaceae is a native of India, Nepal, China, Tibet and Pakistan. In India it is distributed in alpine region of Himalayas from Kashmir to Sikkim, It is a small herbaceous creeping alpine species, represented by two morphological variants in Garhwal Himalaya, viz., narrow leaf (NL) and broad leaf (BL) variants, scarcely occurring at an altitude of 2700- 4500m asl. NL variant is generally found on rock surfaces and near springs while BL under the shrub and scrub canopies. The studies on genetic diversity of this endangered species and its conservation has become a priority in recent years. The main goal is to protect and maintain the evolutionary viability of species and to maximize the chances of its survival and persistence in the changing environment. Due to its important medicinal properties *Picrorhiza kurrooa* is used in both ISM as well as in modern pharmaceutical industries. Drug Picroliv developed from dried stolons and roots of *P. kurrooa* for the treatment of acute and chronic hepatitis and healthy carriers. It is also used as an adulterant or as a substitute of Indian Gentian. Roots and stolons contain iridoid-glycosides picroside I, II and kutkoside which are responsible for the activity of drug. It is also one of the ingredients of herbal formulations claimed to have liver protecting activity. It has chalagogue, choleric, hepatoprotective, anti-periodic, anti-oxidant, anti-inflammatory, anti-vitilego, anti-allergic, anti-cancer, anti-tumor, and anti-juandice applications in both traditional and modern system of medicine.

The curcubitacins in *Picrorhiza* are highly cytotoxic and have anti-tumor activities. Recent studies of the stolons were shown to boost the immune system and to have a specific action against the Parasite *Leshmania donowani* which causes the parasitic disease called leishmaniosis. HAPPRC has developed the cultivation technology for this species and its cultivation is now being carried out by farmers in some high altitude villages of Garhwal.

The overall study in the present paper includes observations on the morphological variations in broad and narrow leaf variants of *Picrorhiza kurrooa* under natural (Tungnath, 3600 m asl) and cultivated conditions (Pothivasa, 2200 m asl). The germplasm of broad and narrow leaf variants collected from both altitudes showed considerable variations. The stolon length, leaf length, number of flowers, number of capsule per plant, number of seeds per capsule and economic yield was found maximum in BL variant of Tungnath whereas minimum in NL variant of Pothivasa. The biochemical parameters viz., carbohydrates, proteins and amino acids were found maximum in BL variant of Tungnath whereas, minimum in NL variants of Pothivasa. This study will be helpful to find out suitable variant having greater adaptability and higher active constituents under cultivated conditions for economic benefit of the cultivators and quality drug for the supply of pharmaceutical industries. This study will also be helpful in formulating the strategy for the protection and conservation of this endangered medicinal herb in its natural habitat.

Effect of tannery sludge amended soil on growth and oil yield of *Menthaspicata* - Its effect on MDA and Proline activity

Anju Patel and D.D. Patra\*

Agronomy and Soil Science

CSIR-CIMAP, Lucknow

Abstract

Rapid expansion and increasing tannery industry in the last century has remarkably increased the amount and complexity of toxic substance into the environment. Production of sludge as a result of waste water treatment plants is generally loaded with high organic matter and high concentration of various heavy metals. The utilization of tannery sludge for growing of food crops in agricultural practice is very common. Its utilization for food crop is not safe, as heavy metal may enter into the food chain. In this study, tannery sludge in various composition with soil were used to investigate its effect on growth of *Menthaspicata*, its oil content and biochemical activity of plant.

Chlorophyll a, chlorophyll b and carotenoid content were maximum in 75:25 combinations of sludge and soil. Malondialdehyde (MDA) and proline content were increases as the concentration of sludge in the treatments increases. This result indicates that MDA and proline play important role against heavy metal stress. Oil yield was maximum in 75:25 combinations of sludge and soil. No detectable amount of Cr, Co, Cd, Pb and Ni in the oil of *Menthaspicata* was found. Oil has wide application in hygiene product preparation and in food flavouring.

Key-words: Heavy metal, Essential Oil, *Menthaspicata*, Chlorophyll  
[Patel7anju@gmail.com](mailto:Patel7anju@gmail.com)

\*[ddpatra@rediffmail.com](mailto:ddpatra@rediffmail.com)

**Status and conservation strategies for some commercially important threatened medicinal plants of Uttarakhand Himalaya**

Vineeta Pandey, Rakesh Tiwari and D.D. Patra\*

Agronomy and Soil Science

CSIR-CIMAP, Lucknow

**Abstract**

The state of Uttarakhand is endowed with a rich variety of medicinal plants, many of which are in great demand both in India and world market. To meet the ever growing global demand, high altitude, rare and threatened medicinal plants are extracted unscientifically and indiscriminately. Consequently, high altitude areas of Uttarakhand have witnessed a serious depletion of its precious biological resources. Present study was aimed at documentation and inventorisation of medicinal plants in natural wild habitats from biodiversity rich herbal areas of Uttarakhand Himalayas. During the study precise location, status, uses and cultivation strategies of important rare, endangered and threatened medicinal herbs was recorded. Two field surveys were conducted during the months of August and September 2011 and 2012. The areas covered were Kedarnath, Tungnath, Valley of flowers, Hemkund sahib, Auli and Malari. Some of the commercially important species which are highly exploited and traded were found to be *Ephedra gerardiana*, *Allium stracheyi*, *Aconitum heterophyllum*, *Saussuria ovlata*, *Angelica glauca*. There is an urgent need to have a scientific conservation strategy backed up by education of the stakeholders employed in the extraction of plants from their natural habitats.

Keywords: Conservation, Endangered, Medicinal Plants

[Pandeyvineeta48@gmail.com](mailto:Pandeyvineeta48@gmail.com)

\*[ddpatra@rediffmail.com](mailto:ddpatra@rediffmail.com)

**Goji Berry -The Ultimate Super food; A real Chi (Life Force): The inside story-Taurine factor**

R C Gupta  
SASRD Nagaland

University

Medziphema 797106 India

With the arrival of second millennium, in China during Tang dynasty (1000-1400 AD), Goji Berry with beautiful orange fruits was considered as “yin” for its utility in strengthen of eyes, liver and kidney, to a great wonder China is also the birth place of this plant. Subsequently Goji berry traveled a long journey and its potential as well as utility in number of other health problems compel to add several other of its benefits to a long list of its usefulness. With time and finding; its utility in strengthen the immune system, improve circulation, sperm production, enhanced sexual performance to modern disease like diabetes, cancer and many others have been well recognized. In this millennium it has now crossed the national boundary of China even it has climb the Great Himalayas, walked through the Asian continent, and it seems that now it has reached the all part our planet. This plant belongs to family of solanaceae, botanically known as *Lycium barbarum* also called wolfberry. The berries are eaten raw, drunk as juice, wine or tea and also processed to tinctures, powders and tablets. The greater acceptability of the plant is due to its role in enhance longevity, hair loss, supplementation to natural testosterone and to increase sperm count. To cope with latest taste and demand it is now part of cookies, crispy bars, chocolates, muesli, sausages and soaps and one can easily found in drug stores, “Reformhauser” and organic food shops. On chemical front, fruit the most valuable part contains, polysaccharides, carotenoids, flavonoids important for anti oxidation properties, besides it also contains minerals like Na, Ca, Mg, Fe, Cu and Mn. The best part of this fruit is, it contain a number of free amino acids of which Taurine is abundant (.32g/100g wet wt). Taurine beneficial action has a board spectrum, and many of its protective action are now well established. Almost all biological action exhibited by Goji berry is also part of broad spectrum

biological properties of taurine; from vision to cancer, anti-oxidation to host defense. It is believed that biological properties of any substance is the cumulate index of its physio-chemicals properties in return the molecules presents as chemical entity and their arrangement, interaction, association, provides synergic effect. It is surprising to know that, Goji berry and taurine has overlapping beneficial properties. The high contents of taurine provide a basis to think; why? Such high concentration of taurine; hence is logical to conclude that it might possible, in; inside story of action mechanism of Goji berry beneficial activities; taurine may be a major contributing agent of its biological action profile. Phyto-chemicals are future bio-molecules for improving human health and preventing diseased states. The in depth study of techno-functional properties of various constituents of this plant is urgently needed and if it is done in proper from then this plant can be efficiently exploited for many fold for food, cosmetic, longevity, ultimate pleasure and medicine application. I am sure with such happening this plant can be synonymous to “life energy” in coming decades.

**Antimicrobial activity of *Pelargonium graveolens***

Vibhu Sharma, Mohd. Irfan & Rajan Kumar

Gupta

Uttarakhand

Government P.G.College, Rishikesh,

[vibhubiotech@gmail.com](mailto:vibhubiotech@gmail.com)

Man has long been associated with plant kingdom since the time immemorial. The enormous plant kingdom contains huge number of trees, herbs and shrubs. Plants have unique importance and have been used for thousands of years for flavor and food preservation, to treat health disorders and to prevent diseases including epidemics.

Investigations of the antimicrobial activities, mode of action and potential uses of plant volatile oils have regained momentum. This is particularly true with regard to plant volatile oils. Many of them have the high activity against Gram-positive and Gram-negative bacteria, as well as against viruses and fungi. Today, antioxidant, antitumor and antiviral, antifungal and antibacterial activity of essential oils and their constituents is broadly studied.

The *Pelargonium graveolens* (Rose geranium), belongs to the Geraniaceae family, is known for its essential oil. The essential oil is extracted from the leaves and stems of the plant. *Pelargonium graveolens* have been found to possess noteworthy pharmacological and biological properties. The main constituents responsible for biological activities are citronellol, geraniol, linalool, isomenthone, nerol and citronellyl formate.

The aim of the present study is to evaluate the antimicrobial activities of the *Pelargonium graveolens* (Rose geranium).

**The distribution pattern of Arbuscular mycorrhizal fungal species in the test plants**

**Mohd. Irfan, Vibhu Sharma, Sumit Kumar Tripathi and Rajan Kumar Gupta**

**Government P.G. College, Rishikesh,  
Uttarakhand**

rajankgupta1@rediffmail.com

Mycorrhiza are widespread in their distribution among different taxa of land plants. There are various types of mycorrhiza, but endomycorrhiza are widespread geographical distribution, having association with almost 90% of plants species. It is generally assumed that this symbiosis facilitated the colonization of land by plant. The investigation has been made for knowing the distribution pattern of AMF species in two test plants *i.e.* *Abelmoschus esculentus* (Bhindi or Okara) and *Brassica campestris* (Sarson or Rai) screened during the different stages of plant growth.

It is clearly evident from the result total 38 AMF species were recorded at site-I and 43 AMF species from site-II. Among the 38 of AMF species of site-I, 24 species belong to genus *Glomus*, 11 species to *Acaulospora*, 2 species to *Gigaspora*, and 1 species to *Scutellospora*. At site-II, among the 43 AMF species, 25 species belong to genus *Glomus*, 12 species to *Acaulospora*, 4 species to *Gigaspora*, and 2 species to *Scutellospora* was observed.

**Assessment of intra - species variation of *Salacia oblonga* and *Salacia reticulata* at molecular level**

**T. Sekar and M. Gopalakrishnan**

Department of Botany, Pachaiyappa's College, Chennai – 600 030, Tamil Nadu, India

Email: [tsekar\\_bot@yahoo.com](mailto:tsekar_bot@yahoo.com)

*Salacia oblonga* and *Salacia reticulata* are woody lianas belongs to the family Hippocrateaceae found in the Western Ghats of India. The roots and stems have been used for prevention or remedy of diabetes and it suppresses the postprandial hyperglycemia and lowering the blood glucose/insulin level. The aim of the present study was to find out genetic diversity among the populations of *S. oblonga* and *S. reticulata* at molecular level by RAPD analysis.

Six different accessions of *S. oblonga* and seven accessions of *S. reticulata* were collected from the Western Ghats in the present investigation. Total genomic DNA was isolated from young leaves of standard procedure with slight modification by adding 0.2% PVP for DNA isolation using CTAB method. The quality and quantity of DNA was analyzed by agarose gel electrophoresis. Extracted DNA was used in subsequent PCR amplifications, which were performed in a programmable thermo cycler. The reaction mixture and cycling parameters were standardized for subsequent species.

Thirty nine random primers were used to screen RAPD-PCR of *Salacia* DNA, out of which eight primers were selected to develop a final RAPD fingerprint. Total amplification of 107 bands was obtained for *S. oblonga* with average amplification of 13 bands. In *S. reticulata*, total amplification of 97 bands with average amplification of 12 bands was observed. The better understanding of genetic variation at the intra specific level help in identifying superior genotype(s) for crop improvement and effective *in situ* and *ex situ* conservation programmes. The results of the diversity analysis have shown significant level of variation among the collected genotypes at genetic level. The studies reveal genetic diversity of *S. oblonga* and *S. reticulata* at species level.

**Subject:** chemistry

Characterization and antioxidant activity of essential oil from leaves of *Cymbopogon winterians*.

*Dr. Anju Bhatnagar, D.B.S(PG) college, Dehradun*

*Oral presentation*

The objective of present study was to determine the antioxidant activity of essential oil extracted from citronella grass during summer season. *Cymbopogon winterians* commonly known “java grass” is a member of family gramineae. The citronella java is the perennial aromatic grass, the leaves of grass rich essential oil content. The oil is very valuable and wide application in pharmaceutical and perfumery industries. About 23 species of plant found in India, approximately one third are aromatic and medicinally important, phyto-chemicals are active chemical ingredients derived from plants, It is used as antimicrobial, antifungal, mosquito repellent and fungitoxic.

Essential oil extracted from dried leaves of citronella grass by hydro-distillation and subjected to GC-MS. Twenty compound were found in the essential oil from dried leaves of *C. winterianus*. The oil contains the poor fractions of monoterpenes as compared to sesquiterpenes. Oil contains higher amount of citronellal (43.01%) geraniol and citronellol (21.02%, 12.22%). The antioxidant capacity of essential oil was determined by 2,2' diphenyl 1- picryl hydrazyl (DPPH) radical scavenging method. Antioxidant capacity of is  $0.41 \pm 0.010$  as compared to  $\alpha$ -tocopherol standard, the light yellow coloured oil containing number of aroma constituents and has the significant anti-oxidant values.

**Key words:** citronellol, geraniol, antioxidant capacity, monoterpenes, sesquiterpenes

***Oral***

**Effect of CO<sub>2</sub> enrichment on Plant Growth and Glucosinolate Content in Seeds of *Brassica juncea* (L.) Czern. & Coss.**

Neha Sharma<sup>1</sup>, Pooja Gokhale Sinha<sup>1</sup>, Shiv Dhar Singh<sup>2</sup>, Ashok Kumar Bhatnagar<sup>1</sup>

<sup>1</sup>Environmental Biology Laboratory, Department of Botany, University of Delhi, Delhi-110007, India

<sup>2</sup>Centre for Environment Sciences and Climate Resilient Agriculture, Indian Agricultural Research Institute, New Delhi-110012, India

Climate change has emerged as an important global environmental issue, particularly challenging the agrarian economies such as India. Global atmospheric CO<sub>2</sub> concentration [CO<sub>2</sub>] has increased by 40% from preindustrial value of 280 L/L to 391 L/L in 2011 (IPCC 2013), and is projected to further rise to 550 L/L by 2050. *Brassica juncea* (Indian mustard), an important oilseed crop has been predicted to be vulnerable to projected climate change and sensitive to variation in CO<sub>2</sub>. Glucosinolates are nitrogenous secondary metabolites in Brassicaceae which impart fungicidal, anti-bacterial and anti-cancerous properties to the oilseed and oil. They are responsible for pungency and the ascribed medicinal properties of mustard oil. The present study was conducted to study the effect of elevated [CO<sub>2</sub>] on plant growth and glucosinolate content of seeds of mustard.

Seeds of *Brassica juncea* var. Pusa Tarak were sown for two consecutive seasons during 2010-2012 in mid-Free Air CO<sub>2</sub> Enrichment Facility (mid-FACE) at Centre for Environmental Sciences and Climate Resilient Agriculture, Indian Agricultural Research Institute (IARI), New Delhi (India). Elevated [CO<sub>2</sub>] of 550 L/L was maintained in the ring throughout the growing period of the crops. Control plants were grown in nearby fields where all other parameters except [CO<sub>2</sub>] were same as that of FACE. Plants were harvested at maturity and morphological growth parameters were analyzed. Seeds obtained at harvest were analyzed for

nutritional composition. Growth parameters such as dry weight of roots and shoots significantly increased in *Brassica juncea* at high [CO<sub>2</sub>]. High Pressure liquid Chromatography (HPLC) analysis of mustard seeds for glucosinolates revealed statistically significant reduction in the concentration of total glucosinolates as well as individual glucosinolates such as epiprogoitrin, glucoiberberin, gluconapin and glucoerucin in both years. Concentration of total soluble sugars as well as starch was significantly higher, while concentration of total protein was lower in the seeds at elevated [CO<sub>2</sub>]. High C:N ratio was observed in seeds of mustard grown in FACE facility. Down-regulation of napin, an important low molecular weight protein was observed in seeds of FACE grown *B. juncea*. Ultrastructure of seeds revealed increased number of plastids surrounding the protein body in cotyledonary cells of young developing embryo.

The study clearly shows that elevated [CO<sub>2</sub>] resulted in increased carbon-containing compounds and reduced synthesis of nitrogenous compounds. Thus, future climate change scenario may have a bearing on medicinal property and nutritional quality of mustard.

**Poster presentation**

**Name: Jyoti Pawar**

**Id No: 35724**

**Msc. Ag Agronomy, 2<sup>nd</sup> yr ( Deptt. Agronomy)**

**G.B.P.U.A.T, Pantnagar**

**U.S. Nagar, Uttarakhand.**

**Email Id: purva3108@gmail.com**

**Subject: Quality control issues**

**Abstract**

Quality is of paramount importance when it is specifically related with drugs. The term quality control refers to the sum of all procedures undertaken to ensure the identity and purity of a particular pharmaceutical. Such procedures may range from the performance of simple chemical experiments which determine the identity and screening for the presence of particular pharmaceutical substance (thin layer chromatography, infrared spectroscopy, etc.), to more complicated requirements of pharmacopoeial monographs. The quality of pharmaceuticals has been a concern of the World Health Organization (WHO) since its inception. The setting of global standards is requested in Article 2 of the WHO Constitution, which cites as one of the Organization's functions that it should "develop, establish and promote international standards with respect to food, biological, pharmaceutical and similar products". The World Health Assembly- in resolutions WHA31.33(1978), WHA40.33(1987) and WHA42.43(1989)- has emphasized the need to ensure the quality of medicinal plant products by using modern control techniques and applying suitable standards.

With the tremendous increase in the global use of medicinal plants, several concerns regarding the efficacy and safety of the herbal medicines have also been raised. Hence it has become necessary to standardize the efficacy and safety measures so as to ensure supply of medicinal plant materials with good quality. Quality control ensures that the plant material is not contaminated with microbes, pesticides, heavy metals or other toxic agents and that the final product is of consistent high standard.

**Poster presentation**

**Name: Priyanka Kabdal**

**Id No: 44003**

**Msc Ag Agronomy 2<sup>nd</sup> yr ( deptt. Agronomy)**

**G.B.P.U.A.T, Pantnagar**

**U.S. Nagar, Uttarakhand**

**Email Id: Priyankak9191@gmail.com**

**Subject: Resistance to biotic and abiotic stresses**

**Abstract**

Biotic and abiotic stresses exert an outstanding influence on the biosynthesis of several secondary metabolites in medicinal plants. In this sense, drought stress, altering biochemical properties of crops, is known to increase the secondary metabolite induction in a variety of medicinal plants, like artemisinin in leaves of *Artemisia annua*, hyperforin in *Hypericum perforatum* leaf tissues. Cultivation of *Trachyspermum ammi* under water-deficiency would increase its defense system and bioactive compounds level as well. Elicitors-induced systems are used for large scale culturing of plant cells from which secondary metabolites could be extracted. An elicitor, not only induces accumulation of antimicrobial phytoalexins in plants but also stimulates any type of defense response.

An added biotechnological benefit to the use of elicitors is the fact that, frequently, they also promote liberation of the active metabolites into the medium. The elicitors such as fungal, bacterial and yeast extract, (biotic) and heavy metal ions (Ag<sup>+</sup>), and UV radiation (abiotic), have also been applied and shown effective to enhance the metabolites like tanshinones in *Salvia miltiorrhiza* hairy root cultures, berberine in *Thalictrum rugosum*, thiophenes in *Tagetes patula*. Recent advances in the molecular biology and fermentation technology suggest that these systems would become a viable source of pharmaceuticals and other beneficial substances. Providing stresses along with new technologies would serve to extend the continued usefulness of higher plants as renewable sources of chemicals, especially medicinal compounds.

**Poster presentation**

**Prospects of intercropping of medicinal plants with agricultural crops**

**Vimal Raj Yadav\*, Subhash Chandra, Akshita Banga, Neeshu and Rekha**

*Department of Agronomy, College of Agriculture*

*G.B.Pant University of Agriculture & Technology Pantnagar -263 145*

*U.S.Nagar, Uttarakhand*

**Email id\*:vimalrajyadav31990@rediffmail.com**

**Abstract**

The importance of intercropping in farming practices has long been recognized. Due to ever increasing pressure on cultivated land for food and commercial crops, there is no scope of increasing the area under medicinal and aromatic plants (MAPs). With dwindling supplies from natural sources and increasing global demand, the MAPs are needed to be cultivated along with agriculture crops to ensure their regular supply as well as conservation. One of the potential opportunities to meet their demand is by inclusion in intercropping systems. Cultivation of high value MAPs along with food crops is creating new dimensions in field of agriculture. In order to derive maximum benefit of soil moisture, nutrients and other inputs, medicinal crops can be grown as inter-crops. Intercropping of MAPs with field crops will provide extra income without affecting growth and yield of the main crop. Several medicinal plants, keeping in view their growth habits can be inter-cropped in orchards, forests and with major field crops. Scientists reported that cultivation of ashwagandha with green gram is proved to be more profitable than compared to sunflower and sesamum, intercropping of pigeonpea in palmarosa increased profitability and intercropping of green gram with bixa is more profitable than sole bixa. Senna can also be taken as intercrop with green gram and black gram. MAPs like mentha spp., cymbopogon spp., rauwolfia serpentina, vetiveria zizanioides and piper longum performed better as intercrops in agroforestry system with eucalyptus, subabool and poplar. Intercropping of cowpea with turmeric

reduce the infestation of cowpea aphid (*Aphis craccivora* Koch) and pod sucking bug (*Riptortus dentipes* Fab) as compared to sole crop. Cultivation of MAPs as intercrop has several advantages like higher net returns per unit area, low incidence of insect pests and diseases, control soil erosion and nutrient loss, improvement of degraded and marginal soils and higher foreign exchange earning potential.

**Key words:** intercropping, medicinal plants, field crops

Please Check REVISED Abstract of Dr.

### **Fucoidan, A component on Human Cancer cell Lines**

Babita Kumari & Vinay Sharma

Department of Biosciences and Biotechnology

Banasthali University

Banasthali

Rajasthan

#### **Abstract**

Fucoidan, a type of sulfated polysaccharides, is reported to evaluate in various biological activities having anti-tumor, anti-coagulation and anti-viral effects. The current study examined the anti-tumor effects of fucoidan extracted from the different species of *Sargassum species* on human cancer cell lines using an MTT assay. Changes in apoptosis and the cell cycle were analyzed by flow cytometry. The results revealed that cell proliferation was suppressed in some cell lines in a time- and/or dose-dependent manner. In contrast, proliferation of the neuroblastoma and 1 of the 2 ovarian carcinoma cell lines was not affected. The ratio of apoptotic cells significantly increased in 5 of the 6 hepatocellular carcinoma cell lines, and the ratio of G2/M cells increased in the 3 hepatocellular cell lines examined. These observations indicate that fucoidan is a potential anti-tumor agent for the treatment of bile duct cancers, such as hepatocellular carcinoma, cholangiocarcinoma and gall-bladder carcinoma.

Keywords : Fucoidan, *Sargassum sp.*, Cancer Lines, Cell Proliferation.

Please Check REVISED Abstract of Dr. Dinesh Semwal