

**WRITTEN ANSWERS TO UNSTARRED QUESTIONS**

**GOVERNMENT OF INDIA  
MINISTRY OF AYURVEDA, YOGA & NATUROPATHY,  
UNANI, SIDDHA AND HOMOEOPATHY  
(AYUSH)**

**RAJYA SABHA  
UNSTARRED QUESTION NO.01  
TO BE ANSWERED ON 2<sup>nd</sup> February, 2021**

**RESEARCH ON VARIOUS ASPECTS OF MEDICINAL PLANTS**

**1 Shri M.V. Shreyams Kumar:**

Will the Minister of **Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy** be pleased to state:

- (a) the details of the research undertaken by the accredited institutions and universities on various aspects of medicinal plants so far in the country
- (b) whether these researches have helped in developing new medicines in Ayurveda
- (c) if so, the details thereof and
- (d) the steps taken by Government to promote ayurvedic medicine globally?

**ANSWER**

**THE MINISTER OF STATE (IC) OF THE MINISTRY OF YOUTH AFFAIRS AND  
SPORTS AND ADDITIONAL CHARGE OF MINISTER OF STATE (IC) OF THE  
MINISTRY OF AYURVEDA,  
YOGA & NATUROPATHY, UNANI, SIDDHA AND HOMOEOPATHY  
(SHRI KIREN RIJJU)**

(a): The National Medicinal Plants Bard (NMPB), Ministry of AYUSH, under its Central Sector Scheme on 'Conservation, Development and Sustainable Management of Medicinal Plants' is supporting research & development projects on various aspects of medicinal plants to government as well as private universities/research institutions/organizations across the country.

In addition, Research Councils viz. Central Council for Research in Ayurvedic Sciences (CCRAS), Central Council for Research in Homoeopathy (CCRH) Central Council for Research in Unani Medicine (CCRUM) and Central Council for Research in Siddha (CCRS), autonomous organizations under the Ministry of AYUSH are also engaged through its research institutions / centre / units in research & development activities on medicinal plants used in concerned system of medicine.

Besides, some premier research institutions under Council for Scientific and Industrial Research (CSIR) like Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow; Indian Institute for Integrative Medicines (IIIM), Jammu; Institute of Himalayan Bioresource Technology (IHBT), Palampur; National Botanical Research Institute (NBRI), Lucknow; North

East Institute of Science and Technology (NEIST), Jorhat and CSIR-Central Drug Research Institute (CDRI), Lucknow are engaged in research on various aspects of medicinal plants. Directorate of Medicinal and Aromatic Plants Research (DMAPR), Anand, Gujarat under Indian Council for Agricultural Research (ICAR) conducts basic, applied and adaptive research on medicinal plants. In addition, a programme on Translational Research for Developing Products and Processes from Medicinal and Aromatic Plants is implemented by the Department of Biotechnology (DBT) for study on various aspects of medicinal plants and aromatic plants.

Details of projects research-wise, institute-wise are at **Annexure-I**.

(b) & (c): Yes, researches undertaken at Central Council for Research in Ayurvedic Sciences under Ministry of AYUSH has developed 24 new drugs. In addition, Council of Scientific & Industrial Research (CSIR) has developed herbal formulations by their supported researches at CSIR-CIMAP, CSIR-NBRI and CSIR-CDRI and technology has been transferred to industry for its commercialization. And, ICAR- DMAPR is also focusing on researches and plant genetic resources/quality planting material. Institutes who are engaged towards developing new medicines can take the advantage of such quality planting material. Details are attached at **Annexure-II**.

(d): Ministry of AYUSH under its Central Sector Scheme for promotion of International Cooperation, (IC Scheme), undertakes various measures to promote & propagate AYUSH systems of medicine including Ayurveda across the globe; and to promote Ayurvedic medicine globally. In addition, the Central Council for Research in Ayurvedic Sciences, Ministry of AYUSH has signed various Agreements/Memorandum of Understanding for promotion of Ayurveda/Ayurvedic Medicines Internationally. Details of the activities are at **Annexure III**.

**1. National Medicinal Plants Board (NMPB)**

During last 05 years, NMPB has supported project based major research activities on various aspects such as:

<b>Sr. No.</b>	<b>Research areas</b>	<b>Number of projects</b>
i.	Survey, identification, characterization and conservation of medicinal plants.	10
ii.	Post-harvest Management, assessment of heavy metals and integrated pest management	14
iii.	Varietal development and prospect of marketing	05
iv.	Genotype Identification, genetic improvement, genome study and germplasm collection & conservation	08
v.	Development of agro techniques, standardization of nursery techniques and cultivation practices	11
vi.	<i>In-vitro</i> propagation studies, micro-propagation chemical & molecular profiling and phyto-chemicals evaluation	21
vii.	Bioactivity guided fractionation studies	06
viii.	Intercropping and sustainable production technology	02
ix.	Documentation and development of geo-tag digital library	01
x.	Finding out substitute and authentication of raw drugs	04

**1.1 Survey, identification, characterization and conservation of medicinal plants**

<b>S.No.</b>	<b>Project no.</b>	<b>Project title and agency detail</b>
1)	AS-01/2016-17	Characterization and chemical composition of High Yielding Varieties of Amada Haldi ( <i>Curcuma zedoaria</i> Rose) and Kali Haldi ( <i>Curcuma Caesia</i> Roxb): Endangered High Value Medicinal Plants. Department of BSTD, CSIR- NEIST, P.O. RRLJorhat–785006, Assam. Plant species:- <i>Curcuma zedoaria</i> and <i>Curcuma caesia</i> .
2)	AS-01/2019-20.	Identification and Development of High Yielding Varieties of <i>Kaempferia galanga</i> : A High Value Endangered Medicinal Plant. CSIR NEIST P.O. RRL Jorhat 785006. Plant species: <i>Kaempferia galanga</i>
3)	DL-01/2018-19	Collection, Characterization and Conservation of <i>Bunium persicum</i> : an Endangered Plant Species. Tissue Culture and Cryopreservation Unit, ICAR- National Bureau of Plant Genetics Resources, New Delhi- 110012. Plant selected: <i>Bunium persicum</i>
4)	HP-01/2017-18	"Survey, mapping, development of cultivation techniques, evaluation of selected germplasm and economics of <i>Fritillaria roylei</i> Hook.f., (Kakoli) an important plant of the Ashtavarga Group of Medicinal and Aromatic Plants". Himalayan Forest Research Institute, Conifer Campus Panthaghati,

		Shimla- 171013. Plants selected:- <i>Fritillaria roylei</i>
		ICAR- NBPGR, Regional Station, Phagli, Shimla, H.P., 171004.
5)	HP-01/2019-20	Survey, Selection, Phyto-chemical Evaluation, Cytogenetical Characterization and Multi-location testing of Harar ( <i>Terminalia chebula</i> Rets) in India. College of Horticulture and Forestry, Dr. YS Parmar University of Horticulture and Forestry, Nauni, Solan-177001. Plant species: <i>Terminlia chebula</i> Rets
6)	R&D/KR-02/2017-18	Identification of elite types, Molecular Characterization and Conservation of Highly-traded and threatened Medicinal Plants in the Central Western Ghats. Plant species: <i>Coscinium fenestratum</i> , <i>Embelia ribes</i> , <i>Salacia oblonga</i> and <i>Mappia foetida</i> . College of Forestry, UAS Dharwad, SIRSI, Utra Kannada, Karnataka - 581401, telephone: 9448933680.
		Ashoka Trust for Research in Ecology and the Environment Conservation Genetics Lab, Royal Enclave Srirampura, Jakkur PO Bengaluru 560064 (ATREE) telephone: 09448182477,
7)	R&D/KR-01/2018-19	"Collection, characterization and Genetic improvement of <i>Eclipta alba</i> " Department of Floriculture and Medicinal crops, Institute of Horticultural Research (IIHR), Hessarghatta lake (PO), Bangalore-89 Pin: 560089. Plant species: <i>Eclipta alba</i>
8)	R&D/TN-04/2016-17	Diversity assessment of <i>Saraca asoca</i> (Roxb.) de Wilde for selection of superior chemotypes and mass propagation. Department of Division of Plant Biotechnology, Institute of Forest Genetics and Tree Breeding (IFGTB), Forest Campus, R.S. Puram. P. O., Coimbatore – 641 002, Tamil Nadu. Plants selected: <i>Saraca asoca</i>
9)	TN-01/2017-18	"Evaluation of Superior phenotypes of neem ( <i>Azadirachta Indica</i> A. Juss.) for Agroforestry systems". Department of forestry, land use and climate change division, P.B. No. 1061, forest Campus, R. S. Puram, Coimbatore, Tamil Nadu -641002. Plants species:- <i>Azadirachta Indica</i>
10)	R&D/WB-03/2017-18	Medicinal orchid: A step towards population for commercial cultivation through collection, conservation and multiplication in Himalayan region of Darjeeling and Sikkim Himalayas. Department of Genetics and Plant breeding & Plant Breeder, Uttar BangaKrishiViswaVidyalaya (UBKV), Regional Research Satation (HZ), Kalimpong, Darjeeling, West Bengal -734301.

## 1.2 Post-harvest Management, assessment of heavy metals and integrated pest management

S.No.	Project no.	Project title and agency detail
1)	R&D/AP-01/2018.	Antagonistic activity of <i>Pongamia pinnata</i> against quorum signal molecule produced by a marine bacterium. Deptt. Of Biotechnology, Vikarama Simhapuri University, Dargamitta, Nellore, A.P. 524003 Plants species:- <i>Pongamia pinnata</i>
2)	R&D/AS-03/2016-17	Post-Harvest loss assessment and SOPs of post-harvest management of some important medicinal plants of Assam AICRP on MAP&B, Department of Horticulture, Assam Agricultural University, Jorhat-785013, Assam. Plants selected: <i>Rauwolfia serpentina</i> , <i>Piper longum</i> , <i>Acorus calamus</i> , <i>Asparagus racemosus</i> , <i>Andrographis paniculata</i> , <i>Ocimum basilicum</i> , <i>Tinospora cordifolia</i> , <i>Homalomena aromatic</i> , <i>Hedychium coronarium</i> and <i>Cenetella asiatica</i>
3)	R&D/GUJ-02/2016-17	Standard Operating Protocols of Post-Harvest Management for Five Selected Medicinal Plants ( <i>Desmodium gangeticum</i> , <i>Gymnema sylvestre</i> , <i>Leptadenia reticulata</i> , <i>Phyllanthus amarus</i> and <i>Eclipta alba</i> ). Department of Organic Chemistry, ICAR-Directorate of Medicinal and Aromatic Plants Research, Boriavi, Anand-387310, Gujarat. Plant species:- <i>Desmodium gangeticum</i> , <i>Gymnema sylvestre</i> , <i>Leptadenia reticulata</i> , <i>Phyllanthus amarus</i> and <i>Eclipta alba</i> .
4)	R&D/GUJ-01/2017-18	Sustainable production technology for Gudmar ( <i>Gymnema sylvestris</i> R. Br.) a medicinal plant with antidiabetic compound gymnemagenin. Department of Horticulture, Institute of ICAR-DMAPR, Anand, Gujarat - 387310. Plant species: <i>Gymnema sylvestre</i> .
5)	R&D/JK-01/2018-19	To study molecular interactions of <i>Bacillus arybhatai</i> antagonism toward <i>Fusarium oxysporum</i> corm rot of <i>Crocus sativus</i> L. School of Biotechnology, University of Jammu, Jammu and Kashmir (J&K). Plant selected: <i>Crocus sativus</i> L.
6)	R&D/KR-04/2016-17	Development of Integrated Pest and Disease Management Practices for the cultivating Medicinal Plants in Karnataka. Forest and Wood Protection Division, Institute of Wood Science & Technology, 18th Cross Malleshwaram, Bangalore-560003, Karnataka. Plants selected: <i>Adhatoda vasica</i> , <i>Gymnema sylvestre</i> , <i>Hibiscus rosa-chinensis</i> , <i>Piper longum</i> , <i>Chlorophytum borivilianum</i> , <i>Morinda citrifolia</i> and <i>Tabernaemontana divaricata</i>
7)	R&D/KR-05/2016-17	Development of methods for screening of pesticide residue in selected botanicals and their extracts. Deptt. of R&D, Natural Remedies Pvt. Ltd., 5 B, Veerasandra Industrial Area, 19th km, Hosur Road, Electronic City, Bangalore-560100, Karnataka. Plant species: <i>Withania somnifera</i> , <i>Baccopa monnieri</i> , <i>Andrographis</i>

		<i>paniculata, Curcuma longa and Ocimum sanctum</i>
8)	R&D/MP-01/2017-18	Post-harvest management practices for medicinal tuber crops. Agro Produce Processing Division, ICAR- Central Institute of Agricultural Engineering, NabiBagh, Berasia Road, Bhopal, Madhya Pradesh Plants selected:- <i>Chlorophytum borivilium, Withania somnifera, Asparagus recemosus &amp; Rauwolfia serpentine</i>
9)	R&D/TN-02/2016-17	Investigation on conduciveness of aflatoxin development in Indian senna ( <i>Cassia angustifolia</i> Vahl.) and its biological management. (Plant Pathology), Department of Plant Pathology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University (TNAU), Coimbatore-641003, Tamil Nadu. Plants selected: <i>Cassia angustifolia</i>
10)	R&D/UP-01/2017-18	Assessment of hazardous metals (As, Cd and Pb) translocation and accumulation in Kalmegh ( <i>Andrographis paniculata</i> ) : Implication of genotype selection for minimal risk to human health. Agronomy and Soil Science, CSIR- CIMAP, Kukrail Picnic Spot Road, Lucknow Plants species:- Kalmegh ( <i>Andrographis paniculata</i> )
11)	R&D UP-01/2018-19	Mycotoxins, fungal and heavy metal contamination of selected herbal raw material and efficacy of some traditionally used plant products as mycotoxins suppressors during post harvest processing Banaras Hindu University, Department of Botany, Institute of Science, B.H. U., Varanasi. Plants species:- <i>Andrographis paniculata, Phyllanthus embelica, Tinospora cordifolia, Senna alexandriana, Withania somenifera, Hemidesmus indicus, Asparagus recemosus</i>
12)	R&D/WB-01/2017-18	Survey of pests and diseases of Medicinal Plants in West Bengal. Regional Research Station (Terai Zone), Directorate of Research (RRS-TZ), Uttar bangaKrishiViswavidyalaya (UBKV), Pundibari-736165, Cooch Behar, West Bengal.
13)	R&D/KR-01/2019-20	Investigations into heavy metal contamination of important medicinal plants grown in wild, in cultivation, in raw drug materials and in market samples in peninsular India. Indian Institute of Horticultural Research Hessarghatta lake (P.O) Bangalore-89, PIN 560089. Plants species:- <i>Bacopa monnieri, Andrographis paniculata</i>
14)	R&D/KR-03/2019-20	Determination of the vector of sandal Spike Disease (SSD) of Indian sandalwood ( <i>Santalum album</i> L.) and development of integrated vector management strategies. Institute of wood Science and Technology, 18th Cross Malleshwaram, Bengalore-560003. Plant species: <i>Santalum album</i>

### 1.3 Varietal development and prospect of marketing

S.No.	Project no.	Project title and agency detail
1)	R&D/AS-04/2016-17	Prospect of Marketing of Medicinal Plants in the State of Assam. Assam Agriculture University, Jorhat-785013, Assam Plants selected: <i>Piper longum</i> , <i>Terminalia aarjuna</i> , <i>Terminalia belerica</i> , <i>Emblica officinalis</i> , <i>Terminalia chebula</i> & <i>Bacopa monnieri</i>
2)	R&D/AS-01/2018-19	Varietal development for high fruit yield and high solasodine content of <i>Solanum khasianum</i> , A high value medicinal plant of North-East India”. CSIR-NIEST (RRL), Jorhat, PIN 785006. Plant species: <i>Solanum khasianum</i>
3)	R&D/GUJ-03/2017-18	Breeding Medicinal Plants for improved yield and Quality. ICAR-Directorate of Medicinal and Aromatic Plants Research, Boriavi, Anand Gujarat-387310. Plant species: <i>Desmodium gangeticum</i> ; <i>Senna tora</i> , <i>Ocimum tenuiflorum</i> , <i>Solanum surattense</i>
		Department of Medicinal and Aromatic Crops, Tamil Nadu Agricultural University- Coimbatore-641003 TNAU.
		AICRP on Medicinal, Aromatic Plants and Betel vine, College of Horticulture (COH) Mandasaur-458001 (M.P.).
4)	R&D/KE-02/2016-17	The medicinal plants market in South India: Economic value and Tribal Rights. Forest Economic Department, Kerala Forest Research Institute, Peechi, Thrissur-680653, Kerala.
5)	R&D/UP-02/2016-17	Development of high yielding pellitorin rich Akarkara ( <i>Aanacyclus pyrethrum</i> ) variety and its region specific field trail in farmers field. Genetics and Plant Breeding Division, CIMAP, Kukrail Picnic Spot Road, Lucknow-226015, Uttar Pradesh. Plants species:- Akarkara ( <i>Aanacyclus pyrethrum</i> ).

### 1.4 Genotype Identification, genetic improvement, genome study and germplasm collection & conservation

S. No.	Project no.	Project title and agency detail
1)	R&D/HP-02/2016-17	Evaluation of genetic superiority and stability of identified high active ingredient content accessions of <i>Picrorhiza kurroa</i> Royle ex Benth., <i>Valeriana jatamansi</i> Jones and <i>Podophyllum hexandrum</i> Royle through multi-location trials and promotion of their cultivation amongst rural communities. Non Wood Forest Products, Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla-171009, Himachal Pradesh. Plants species:- <i>Picrorhiza kurroa</i> Royle ex Benth., <i>Valeriana jatamansi</i> Jones and <i>Podophyllum hexandrum</i> Royle

2)	R&D/UP-01/2016-17	Identification of <i>Swertia chirayita</i> genotype (s)/strain (s) performing well under lower Himalayan altitude of Uttarakhand. Department of Seed Quality Lab, Genetics & Plant Breeding Division, Central Institute of Medicinal and Aromatic Plants (CSIR), P.O. CIMAP, Lucknow-226015, Uttar Pradesh. Plants selected: <i>Swertia chirayita</i> .
3)	R&D/UP-03/2016-17	Conservation and Genetic Improvement of Prishnparni ( <i>Uraria picta</i> )- a critically endangered Dashmool drug. Genetics & Plant Breeding Division, Central Institute of Medicinal and Aromatic Plants, Kukrail Picnic Spot Road, P.O. CIMAP, Lucknow-226015, Uttar Pradesh. Plants species:- Prishnparni ( <i>Uraria picta</i> )
4)	R&D/UK-01/2018-19	Develop Germplasm Repository of Endangered Medicinal Tree <i>Oroxylum indicum</i> (Shyonak). Non-Wood Forest Products Division, Forest Research Institute-P.O. New Forest Dehradun, Uttarakhand-248006 Plant selected: <i>Oroxylum indicum</i> (Shyonak)
5)	R&D/GUJ-01/2019-20	Decoding metabolic pathways of shankhpushpi ( <i>Convolvulus pluricaulis</i> ) through de novo transcriptome approach. Genomics Research, Xcelris Labs Ltd. Ahmedabad, 1st Floor, Sydney House, old Premchand Nagar Road, Opp. Satyagrah Chhavani, Bodakdev, Ahmedabad, Gujarat Plant selected: <i>Convolvulus pluricaulis</i>
6)	R&D/KR-02/2019-20	Inducing the Variation in <i>Santalum album</i> Linn. By Polyploidy Techniques for Genetic Improvement. Institute of Wood Science and Technology , 18th Cross, Malleshwaram, Bangalore- 560003 Plant species: <i>Santalum album</i>
7)	R&D/KE-03/2020-21	Germplasm conservation and Phytochemical evaluation of <i>Adhatoda beddomei</i> C.B.CI. (Cittaadalotakam). Department of Botany, University of Kerala, Kariavattom, pin-695581, Thruvananthapuram. Plant species: <i>Adhatoda beddomei</i>
8)	R&D/WB-03/2016-17	Collection, Conservation, Digitization and Standardization of Protocol for Mass Regeneration of Selected Endangered, Rare and Vulnerable Medicinal Plants of North East region Department of Genetics and Plant Breeding, RRS (HZ), Uttar Banga Krishi Vishwavidyalaya, Kalimpong -734301, Darjeeling, West Bengal

### 1.5 Development of agro techniques, standardization of nursery techniques and cultivation practices

S. No.	Project no.	Project title and agency detail
1)	AS-01/2017-	"Development, Standardization and dissemination of cultivation package

	18	<p>for medicinal plants of commercial importance in foot hill region of Eastern Himalaya".</p> <p>Department of Crop Physiology, BN collage of Agriculture, AAU, Biswanath Chariali, Dist. Biswanath, Assam-784176.</p> <p>Plants selected:- <i>Acorus calamus</i>, <i>Clitoria ternatea</i>, <i>Artemisia annua</i>, <i>Ferula foetida</i>, <i>Ipomoea mauritiana</i>, <i>Panax pseudoginseng</i></p>
2)	R&D/GUJ-01/2016-17	<p>Standardization of propagation techniques and QPM production of selected medicinal plants.</p> <p>Department of Horticulture, ICAR-Directorate of Medicinal and Aromatic Plants Research, Boriavi-387310, Anand, Gujarat.</p> <p>Plants selected: <i>Asparagus racemosus</i>, <i>Aloe barbadensis</i>, <i>Bacopa monnieri</i>, <i>Chlorohyctum borivilianum</i>, <i>Centella asiatica</i>, <i>leptadenia reticulata</i>, <i>Ocimum sanctum/basilicum</i> &amp; <i>Tinospora cordifolia</i>.</p>
3)	R&D/HP-01/2016-17	<p>Standardization of nursery and propagation methods of <i>Trillium govanianum</i> Wall. Ex D. Don (Nag chhatri).</p> <p>Non Wood Forest Products, Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla-171009, Himachal Pradesh.</p> <p>Plant Species:-<i>Trillium govanianum</i> Wall. ex D. Don (Nag Chhatri).</p>
4)	R&D/HP-03/2016-17	<p>Standardization of nursery techniques for mass multiplication of <i>Polygonatumcirrhifolium</i> (Wall.) Royle (Mahameda) and its extension among local communities.</p> <p>Department of Silviculture and Tree Improvement, Himalayan Forest Research Institute (HFRI), Conifer Campus Panthaghati, Shimla-171013, Himachal-Pradesh.</p> <p>Plants selected: <i>Polygonatum cirrhifolium</i></p>
5)	JK-01/2017-18	<p>Cultivation studies of some endangered and commercially viable medicinal plants of Trans Himalaya and production of quality germplasm. National Research Institute of Sowa-region, Leh, Ladakh.</p>
6)	KE-01/2018-19	<p>Participatory NTFP yielding medicinal plants resource enhancement: Capacity building through protocols for propagation, enrichment planting and management practices of ten high demanding medicinal plants of Western Ghats, KeralaKerala Forest Research Institute, Peechi, Thrissur, kerala-680653.</p> <p>Plant selected: <i>Canarium strictum</i>, <i>Hydnocarpus pentandra</i>, <i>Garcinia gummi-gutta</i> var. <i>gummi-gutta</i>, <i>Gmelina arborea</i>, <i>Cinnamomum malabratrum</i> Blume, <i>Oroxylum indicum</i> Benth, <i>Perseam acrantha</i>, <i>Sapindus trifoliatus</i>, <i>Spondias pinnata</i>, <i>Symplocos cochinchinensis</i>.</p>
7)	R&D/KR-02/2016-17	<p>Standardization of production technology for growing medicinal and aromatic plants under protected conditions.</p> <p>Department of University of Agricultural Sciences, Dharwad, Hi-Tech Horticulture Unit, University of Agriculture Sciences, Dharwad-580005,</p>

		Karnataka. Plants selected: <i>Alpinia galanga</i> , <i>Artemisia annua</i> , <i>Boerhaavia diffusa</i> , <i>Chlorophytum borivilianum</i> , <i>Coleus barbatus</i> , <i>Stevia rebaudiana</i> , <i>Gloriosa superba</i> , <i>Glycyrrhiza glabra</i> , <i>Panax pseudo-ginseng</i> & <i>Rauwolfia serpentina</i>
8)	UK-01/2019-20	Standardization of propagation protocols for mass multiplication, biochemical assessment and elite identification of <i>Malaxis mucifera</i> and <i>Malaxis acuminata</i> in Western Himalaya. G. B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD)Garhwal Unit, Srinagar Garhwal - 246174 Plant species: <i>Malaxis mucifera</i> and <i>Malaxis acuminata</i>
9)	R&D/WB-04/2016-17	Introduction, evaluation and standardization of nursery technology of living fossil <i>Ginkgo biloba</i> (Ginkgoaceae) in Hill and Terai Agro – climatic zones of West Bengal. Deptt. of Plant Pathology,RRS (Hill Zone), Uttar BangaKrishi Viswavidyalaya, Kalimpong-734301, Darjeeling, West Bengal. Plants selected: <i>Ginkgo biloba</i>
10)	R&D/WB-05/2016-17	Standardization of Agro-technology and Mass Multiplication for Production of Quality Seedlings of <i>Woodfordia fruticosa</i> , <i>Sida cordifolia</i> and <i>Desmodium gangeticum</i> . Department of Forestry, Uttar Banga Krishi Vishwavidyalaya, Pundibari-736165, Cooch Behar, West Bengal. Plants selected: <i>Woodfordia fruticosa</i> , <i>Sida cordifolia</i> and <i>Desmodium gangeticum</i>
11)	R&D/KE-01/2020-21	Genetic stock development , standardization of good agricultural practices (GAPs) and market analysis of <i>Pseudarthria viscida</i> (L.)- are listed high volume trade medicinal plants. Collage of Horticulture, Kerala Agriculture University, KAU P.O , Thrissur District. PIN 680656 Plants Species:- <i>Pseudarthria viscida</i>

#### 1.6 In-vitro propagation studies, micro-propagation chemical & molecular profiling and phyto-chemicals evaluation

S.No.	Project no.	Project title and agency detail
1)	Aru.-01/2018-19	Chemical profiling, quantification of bioactive constituents of ethno-medicinal plant of Arunachal Pradesh. Natural Product Chemistry Section, CSIR-North East Institute of Science and Technology, Itanagar; CSIR-NEIST (formerly R.R.L.), Branch Itanagar G-Sector, Naharlagun, Arunachal Pradesh – 791110 Plant species:- <i>Zanthoxylum oxyphyllum</i> , <i>Zanthoxylum rhetsa</i> , <i>Allium hookeri</i> , <i>Allium chinense</i>
2)	HP-03/2017-18	In vitro propagation and genetic stability analysis of <i>Trillium govanianum</i> (nag chhatri)- a red listed medicinal herb of North Western

		Himalayan region. Dr. YS Parmar University of Horticulture & Forestry, Nauni, Solan 173230 (HP). Plant species: <i>Trillium govanianum</i>
3)	JK-02/2017-18	In-vitro conservation and phytochemical analysis of <i>Curcuma zedoaria</i> Roscoe (Safed Haldi): an underutilized medicinal plant. School of Biotechnology, University of Jammu, Jammu-180006. Plants species:- <i>Curcuma zedoaria Roscoe</i> (SafedHaldi)
4)	R&D/MH-01/2016-17	Exploration of <i>Garcinia Indica</i> Choisy for Newer Phytochemicals, Bioactive and Female Plant Production Using Tissue Culture Technology. Plant Tissue Culture Division, CSIR-National Chemical Laboratory, Pashan, Pune-411008, Maharashtra. 64064 Plants species:- <i>Garcinia Indica</i>
5)	R&D/MH-02/2016-17	Utilization of pomegranate for development of functional Medicinal ingredients. ICAR-National Research Centre on Pomegranate, NH-65, Solapur-Pune Highway, Kegaon, Solapur-413255, Maharashtra. Cancer Biology and Inflammatory Disorder Division CSIR-Indian Institute of Chemical Biology, 4, Raja S.C. Mullick Road, Kolkata-700032, West Bengal. ICAR-IIHR, Bangalore: Dr. (Mrs.) Debi Sharma, Principal Investigator and Scientist, ICAR-Indian Institute of Horticultural Research (IIHR), Hesaraghatta Lake P.O., Bangalore-560089, Karnataka.
6)	R&D/RAJ-01/2016-17	Clonal Propagation, Characterization and Biochemical analysis of <i>Leptadenia reticulata</i> and <i>Tylophora indica</i> – threatened medicinal plants. Plants Species:- <i>Leptadenia reticulata</i> and <i>Tylophora indica</i> Arid Forest Research Institute (AFRI), New-Pali Road, Jodhpur-342005, Rajasthan. Department of Botany, Jai Narain Vyas University (JNVU), Jodhpur-342005, Rajasthan.
7)	R&D/RAJ-03/2016-17	Ex- situ Conservation Using In Vitro Methods of an Endangered Plant <i>Sterculia urens</i> Roxb.: A High Volume Trade Plant for Gum Karaya. Department of Biosciences, Manipal University, Jaipur – Ajmer Express Highway, Jaipur-303007, Rajasthan. Plants species:- <i>Sterculia urens</i> Roxb.
8)	R&D/RAJ-04/2016-17	Non-destructive in vitro production of pharmaceutically active natural extract containing guggulsterones-a potent cardio-protective and anti-cancer drug from <i>Commiphora wightii</i> (Guggul) using bioreactor. Forest Genetics and Tree Breeding, Room No. 36, FGTB Division, Arid Forest Research Institute (AFRI), New Pali Road, Jodhpur - 342005, Rajasthan. Plants species:- <i>Commiphora wightii</i> (Guggul)

9)	PUN-01/2018-19	In vitro Propagation of <i>Hemidesmus indicus</i> (L.) R. Br. And Characterization of Coumarins in Adventitious Root Cultures. Department of Botany, Kanchi Mamunivar Centre for postgraduation studies, Puducherry, India PIN-605008 . Plant selected: <i>Hemidesmus indicus R.Br.</i>
10)	R&D/TL-01/2016-17	Evaluation of medicinal plant extracts for anti-tick activity and identification of active compounds. National Institute of Animal Biotechnology (NIAB), Opp. Journalist Colony, Near Gowlidoddy, Extended Q City Road, Gachibowli, Hyderabad, Telangana- 500032. Telangana. Plants selected: 1. <i>Annona muricata</i> , 2. <i>Adhatoda vasica</i> , 3. <i>Artemisia vulgaris</i> , 4. <i>Bacopa monnieri</i> , 5. <i>Syzygium cumini</i> , 6. <i>Cymbopogon citratus</i> , 7. <i>Eucalyptus citridora</i> , 8. <i>Datura fruits</i> , 9. <i>Cedrus deodara oil</i> , 10. <i>Sphaeranthus indicus</i> , 11. <i>Azadirachta indica</i> - good for comparator.
11)	R&D/TL-01/2017-18	"Production of Young roots for medicinal tree species using high density short term plantation scheme Submitted through: CEO, Telangana". Agricultural college, Aswaraopet, Khammam (District), Telangana-507301, Plants selected:- <i>Aegle marmelos</i> , <i>Premna integrifolia</i> , <i>Oroxylum indicum</i> , <i>Gmelina arborea</i> , <i>Stereospermum suaveolens</i> .
12)	R&D/TN-01/2016-17	Micropropagation and phytochemical analysis of some medicinal plants used by tribals of Elagiri, Javvadu and Yercaud hills in Tamil Nadu. Deptt. of Biotechnology, School of Life Sciences, VELS University, Mallika Nagar, Old Pallavaram, Chennai-600117, Tamil Nadu. Plants selected: <i>Illicium verum</i> , <i>Cimicifuga racemosa</i> , <i>Hydrastis canadensis</i> , <i>Ferula marmarica</i> and <i>Ternna asiatica</i> .
13)	R&D/UK-01/2016-17	Phytochemical evaluation of <i>Habenaria edgeworthii</i> Hook. F. ex. Collett and <i>Habenaria intermedia</i> D. Don, the important Astavarg species. Chemistry Division, Forest Research Institute (FRI), P.O. New Forest, Dehradun-248006, Utrkhand. Plants selected: <i>Habenaria edgeworthii</i> and <i>Habenaria intermedia</i>
14)	UK-02/2018-19	In vitro mass propagation of <i>Angelica glauca</i> Edgew. Rootlet biomass for the production of bioactive phytocompound/s using bioreactor and bio-inoculation technology" Forest Pathology Division, Forest Research Institute, Dehradun-248006 Plant selected: <i>Angelica glauca</i>
15)	R&D/WB-02/2017-18	Development of sensor probes for quantification of active constituents in <i>Andrographis paniculata</i> and <i>Piper nigrum</i> using Near Infrared Spectroscopy (NIRS). Department of Instrumentation & Electronics Engg., Jadavpur University, Salt Lake Campus, Block LB, Sector III, Kolkata-700098 Plants species:- <i>Andrographis paniculata</i> and <i>Piper nigrum</i>
16)	R&D/WB-01/2018-19	Screening of seed invigoration techniques for uniform crop establishment in selected medicinal plants of Hill and Terai zones of West Bengal.

		Department of Seed Science and Technology, Uttar BangaKrishiViswavidyalaya, Pundibari, Cooch Behar-736165, West Bengal.
17)	WB-02/2018-19	Assessment of production potentiality of secondary metabolites of some important medicinal plants under changed climatic condition in two important agro-climatic zones of West Bengal. Department of Agricultural Meteorology and Physics, Bidhan Chandra KrishiViswavidyalaya, P.O KrishiVishwavidyalaya, Mohanpur, Nadia, West Bengal-741252. Plant selected:- <i>Piper nigrum</i> , <i>Eclipta alba</i> , <i>Terminalia bellirica</i> , <i>Stevia</i> , <i>Withania somenifera</i> , <i>Adhatoda vasica</i> , <i>Aloe vera</i> , <i>Azadirachta indica</i> , <i>Bacopa monnieri</i> , <i>Andrographis paniculata</i> , <i>Rauvlfhia serpentine</i> , <i>Acorus calamus</i> and <i>Ocimum sanctum</i>
18)	HP-02/2019-20	Cyto-morphological. Phytochemical, Molecular Characterization and Formulation of New Herbal Product from selected species of Genus <i>Berreriis</i> (L.) from Himachal Pradesh. Department of Botany, Akal Collage of Basic Science, Eternal University, Baru Sahib, District Sirmour, Himachal Pradesh. Plant selected:- <i>Berreriis</i> (L.)
19)	UP-01/2020-21	Chemometric Assisted Chromatographic Fingerprinting /marker Based Method To Distinguish <i>Sida</i> Complex Dr. KARUNA SHANKER Principal Scientist, CSIR-Central Institute Of Medicinal And Aromatic Plants, PO CIMAP, Lucknow, Uttar Pradesh-226015 Plant selected:- <i>Sida cordifolia</i> , <i>Sida rhombifolia</i> , <i>Sida cordata</i> & <i>Sida acuta</i>
20)	KE-04/2020-21	Bioprospecting Of Wild Germplasm Of <i>Salacia Oblonga</i> Wall., A High Value Antidiabetic Plant..... Dr RK Radha M Phil PhD Scientist Biotechnology And Bioinformatics Division Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Thiruvananthapuram - 695 562 Kerala Plant selected:- <i>Salacia oblonga</i>
21)	KR-01/2020-21	Development and validation of analytical methods for detection and estimation of 28 Pyrrolizidine alkaloids in selected herbal products, Gururaj G.M. , Manager, Department of Research and Development , Natural Remedies Pvt. Electronic City, Bangalore, Karnataka. Plant selected:- <i>Glycyrrhiza glabram</i> <i>Bacopa monnieri</i> , <i>Andrographis paniculata</i> , <i>Withania somnifera</i> & <i>Ocimum sanctum</i>

### 1.7 Bioactivity guided fractionation studies

S.No.	Project no.	Project title and agency detail
1)	AS-02/2016-17	Bioactivity guided fractionation of <i>Dillenia indica</i> Linn. and <i>Murraya koeningii</i> leaf extract for anti-diabetic potency.

		University of Asian Institute of Management and Technology /Guwahati, 12, Bhaskar Nagar, R.G. Barua Road, Guwahati-781021, Assam. Plants selected: <i>Dillenia indica</i> and <i>M. koenigii</i>
2)	R&D/TN-03/2016-17	Bio- activity guided fraction and elucidation of anticancer compounds from <i>Flacourtia indica</i> tree bark. Deptt. of Centre for advanced research in Indian system of Medicine School of chemical and Biotechnology, SASTRA University, Thirumalaisamudram, Thanjavur-613401, Tamil Nadu. Plants selected: <i>Falcourtica indica</i>
3)	R&D/WB-02/2016-17	Bioactivity guided fractionation of phytochemicals from medicinal plants against brain malignancy authenticated by DNA bar coding. Department of Centre for Healthcare Science and Technology, Indian Institute of Engineering Science and Technology (Former BESU), Shibpur, Howrah-711103, West Bengal. Plants selected: <i>Bacopa monnieri</i> , <i>Convolvulus pluricaulis</i> , <i>raphanus sativus</i> , <i>Bauhinia variegata</i> , <i>Semicarpus anacardium</i> , <i>Swertia chirata</i> & <i>Azadirachta indica</i> .
4)	R&D/DL-01/2019-20	Identification of MARK 4 inhibitors from bioactive phytoconstituents of <i>Bacopa Monnieri</i> (Brahmi): Therapeutic management of Alzheimer's disease and neuro-inflammation animal model. Centre for Interdisciplinary Research in Basic Sciences, Jamia Milia Islamia, Jamia Nagar Delhi -110025. Plants selected: <i>Bacopa Monnieri</i>
5)	R&D/WB-01/2019-20	Bioactivity guided fractionation of selected Indian Medicinal Plants to isolate and characterize HCV RNA dependent RNA Polymerase (NS5B) inhibitors Center for Advanced Studies, Department of Botany, Calcutta University, Kolkata, 35, Ballygunge circular road, Kolkata Pin-700019 Plant Species:- <i>Valeriana wallichii</i> , <i>Eclipta alba</i> , <i>Andrographis paniculata</i> , <i>Acacia nilotica</i> , <i>Zingiber officinale</i> , <i>Glycerrhiza glabra</i> , <i>Tinospora cardifolia</i> , <i>Embelia ribes</i> , <i>Swietenia macrophylla</i> , <i>Alpinia galangal</i> , <i>Kaempferia parviflora</i> , <i>Hypericum perforatum</i> , <i>Silybum marianum</i>
6)	R&D/KE-02/2020-21	Bioactivity guided fractional and isolation of bioactive compounds from selected medicinal plants with anticancer potential against triple negative breast cancer. Collage of Veterinary and Animal Science, Mannuthy Pin 680651 Plants Species:- <i>Thespesia populnea</i>

### 1.8 Intercropping and sustainable production technology

S.No.	Project no.	Project title and agency detail
1)	R&D/KR-03/2016-17	Demonstration of techno-economic feasibility of NMPB developed agro-technologies in promoting medicinal plants cultivation amongst farmers of North Karnataka.

		Deptt. of Agricultural Education, College of Agricultural, University of Agricultural Sciences, Dharwad-580005, Karnataka. Plants selected: <i>Ocimum sanctum</i> , <i>Gymnema sylvestre</i> , <i>Coleus forskohlii</i> , <i>Centella asiatica</i> , <i>Tinospora cordifolia</i> and <i>Andrographis paniculata</i>
2)	R&D/MH-03/2016-17	Development of suitable companion cropping system with medicinal plants. Nagarjuna Medicinal Plants Garden, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola-444104, Maharashtra. Plant species:- : <i>Chlorophytum borivilianum</i> , <i>Andrographis paniculata</i> , <i>Mucuna pruriens</i> and <i>Withania somenifera</i>

### 1.9 Documentation and development of geo-tag digital library

S.No.	Project no.	Project title and agency detail
1)	HP-02/2017-18	Development of geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foot hills of Western Himalayas. Department of High Altitude Biology (HAB) Division, Palampur, Himachal Pradesh-176061.

### 1.10 Finding out substitute and authentication of raw drugs

S.No.	Project no.	Project title and agency detail
1)	R&D/GUJ-02/2017-18	Investigation of <i>Taverniera cuneifolia</i> (Roth) Ali, as a sweetener for sustainable of <i>Glycyrrhizaglabra</i> L. in herbal formulation Department of Botany, The Maharaja Soyairao University of Baroda, Sayagigunj, Vadodara - 390002. Plant species: <i>Taverniera cuneifolia</i>
2)	R&D/KE-01/2016-17	Authentication of major commercially traded raw drugs in the Ayurvedic systems of medicine India. Forest Genetics & Biotechnology Division Kerala Forest Research Institute, Peechi-680653, Kerala Plants species:- <i>Sida alnifolia</i> L., <i>Coscinium fenestratum</i> (Gaertn.) <i>Colebr.</i> , <i>Saraca asoca</i> (Roxb.) de Wilde, <i>Terminali acuneata</i> Roth, <i>Desmodium gangeticum</i> (L.) DC.
3)	R&D/OR-01/2016-17	Evaluation of unexplored <i>Ardisia solanacea</i> and <i>Aegiceras corniculatum</i> plants of Myrsinaceae family as embelin and other related compounds producing substitutes for overexploited RET medicinal species <i>Embelia ribes</i> & <i>E. tsjeriam</i> –cottam. Seed Bank and Seed Biology Division, Regional Plant resource Centre (RPRC), Nayapalli, Bhubaneswar-751015, Odisha.
4)	PB-01/2019-20	Development of an interactive mobile app 'Q-CHECK' and parameter profiling for Quality Certification of Herbs from North India.

	Department of Pharmaceutical Science & Technology, Maharaja Ranjit Singh Punjab Technical University, Bathinda, Punjab.
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## **2. Central Council for Research in Ayurvedic Sciences (CCRAS)**

### Details of peripheral centres-

<b>Sl. No.</b>	<b>Name of Institute</b>	<b>State / Union Territory</b>
(1)	Ayurveda Tribal Health Care Research Project, Port Blair	Andaman & Nicobar Islands
(2)	National Ayurveda Research Institute for Vector Borne Diseases, Vijayawada	Andhra Pradesh
(3)	Ayurveda Regional Research Institute, Itanagar	Arunachal Pradesh
(4)	North East India Ayurveda Research Institute, Guwahati	Assam
(5)	Ayurveda Central Research Institute, Patna	Bihar
(6)	Ayurveda Central Research Institute, New Delhi	Delhi
(7)	Ayurveda Contraceptive Drug Research Institute, Ahmedabad	Gujarat
(8)	Ayurveda Regional Research Institute, Mandi	Himachal Pradesh
(9)	Ayurveda Regional Research Institute, Jammu	Jammu & Kashmir
(10)	National Research Institute for Sowa-Rigpa, Leh	
(11)	National Ayurveda Dietetics Research Institute, Bangalore	Karnataka
(12)	Advanced Center for Ayurveda in Mental Health & Neurosciences, Bangalore	
(13)	National Research Institute for Panchakarma, Cheruthuruthy	Kerala
(14)	Ayurveda Research Institute for Mother and Child Health Care, Trivandrum	
(15)	National Research Institute for Ayurveda -Siddha Human Resource Development, Gwalior	Madhya Pradesh
(16)	National Research Institute of Basic Ayurvedic Sciences, Pune	Maharashtra
(17)	Ayurveda Cancer Research Institute , Mumbai	
(18)	Ayurveda Mental Health Research Institute, Nagpur	
(19)	Herbal Ayurveda Research Centre, Nagaland	Nagaland
(20)	National Research Institute for Ayurveda Drug Development, Bhubaneswar	Odisha
(21)	National Institute of Ayurvedic Pharmaceutical Research, Patiala	Punjab
(22)	Ayurveda Central Research Institute, Jaipur	Rajasthan
(23)	Ayurveda Regional Research Institute, Gangtok	Sikkim
(24)	Captain Srinivasa Murthy Research Institute for Ayurvedic sciences Drug Development, Chennai	Tamilnadu
(25)	Dr. Achanta Lakshmiapati Research Centre for Ayurveda, Chennai	
(26)	National Institute of Indian Medical Heritage, Hyderabad	Telengana
(27)	National Vriksha Ayurveda Research Institute, Jhansi	Uttar Pradesh
(28)	National Veterinary Ayurveda Research Institute, Lucknow	

(29)	Regional Research Institute of Himalayan Flora, Tarikhet, Ranikhet	Uttarakhand
(30)	National Research Institute for Ayurveda Drug Development, Kolkata	West Bengal

Details of studies on various aspects are done at peripheral centres:

<b>Sr.no</b>	<b>Area</b>	<b>Number of Studies</b>
1)	Cultivation of Medicinal plant species	736
2)	Development of Agrotechniques for Medicinal Plants	30
3)	Studies on In-vitro cultivation of Medicinal plants	14
4)	Pharmacognostic studies carried out	312
5)	Drug standardization carried out	3227
6)	Biological activities carried out	389
7)	Safety studies of various samples of carried out	160

### **3. Central Council for Research in Homoeopathy (CCRH)**

Details of research undertaken on various aspects of medicinal plants;-

I. Drug Standardization- 344 medicinal plants

II. Drug Proving- 90 medicinal plants

III. Clinical Verification- 82 medicinal plants

### Drug Standardization Research-

S. No.	Unit	No. of plants
1.	Dr. D. P. Rastogi Central Research Institute (H), NOIDA (Uttar Pradesh)	104
2.	Drug Standardization Unit (DSU), Hyderabad	239
3.	Dr. Anjali Chatterjee Central Research Institute, Kolkata	05
	Total	344

### Drug Proving-

1. Dr. D.P.Rastogi Central Research Institute(H), NOIDA (Uttar Pradesh)
2. Central Research Institute(H), Kottayam (Kerala)
3. Homoeopathic Drug Research Institute, Lucknow (Uttar Pradesh)
4. Dr. Anjali Chatterjee Regional Research Institute(H), Kolkata (West Bengal)
5. Regional Research Institute(H), Gudivada (Andhra Pradesh)
6. Regional Research Institute(H), Navi Mumabi (Maharashtra)
7. Extension Unit of Regional Research Institute(H), Puri at Dr. A.C. Homoeopathic Medical College & Hospital, Bhubaneswar (Odisha)
8. Regional Research Institute(H), Jaipur (Rajasthan)

### Clinical Verification

The Clinical Verification Program is being undertaken at the following institutes/units

S.NO.	State	CENTRE
1.	Tripura	Regional Research Institute, (H), Agartala
2.	Odisha	Drug Proving Research Unit, Bhubaneswar
3.	Andhra Pradesh	Regional Research Institute, (H), Gudivada
4.	Assam	Regional Research Institute, (H), Guwahati
5.	Manipur	Regional Research Institute, (H), Imphal
6.	Kolkata	Dr Anjali Chatterjee Regional Research Institute, (H)
7.	Uttar Pradesh	Homoeopathic Drug Research Institute, (H) Lucknow
8.	Uttar Pradesh	Dr. D.P. Rastogi Central Research Institute, (H), Noida
9.	Bihar	Clinical Verification Unit, (H), Patna
10.	Andaman & Nicobar Islands	Clinical Research Unit, (H), Port Blair
11.	Odisha	Regional Research Institute, (H), Puri
12.	Himachal Pradesh	Regional Research Institute, (H), Shimla
13.	Maharashtra	Regional Research Institute, (H), Mumbai
14.	Kerala	National Homoeopathy Research Institute in Mental Health, Kottayam

#### **4. Council of Scientific & Industrial Research (CSIR)**

CSIR-CIMAP is working on Indian system of medicine to scientifically validate and standardised these traditional medicines along with dissemination of knowledge associated with medicinal and aromatic Plants.

CSIR-IIIM is involved in conservation and captive cultivation of indigenous medicinal plants in the Institutional farms at Chatha Jammu, BoneraPulwama and Yarikha in Kashmir.

CSIR-NBRI is working for cultivation, post harvesting and value addition of medicinal plants, development of quality standards of medicinal plants and preparation of monographs thereof, Identification and characterization of novel anti-viral compounds from medicinal plants, Identification and development of a web-enabled database on medicinal plants used in ISM (Ayurveda, Siddha & Unani), Herbal product development for industrial application etc.

CSIR-CDRI has evaluated more than 4500 medicinal plants for bioactivity in various disease models available with them.

CSIR-IHBT is involved in quality planting material production of medicinal plants and rear endangered and threatened species (RETs), captive cultivation of RET and study on impact of climate change on biomass yield.

#### **5. Indian Council of Agricultural Research (ICAR)**

ICAR-Directorate of Medicinal and Aromatic Plants Research (ICAR-DMAPR) Anand, Gujarat conducts basic, applied and adaptive research on medicinal and aromatic plants on 11 mandated crops viz. Aloe vera, Guggal, Senna, Isabgol, Aswagandha, Giloe, Safedmusli, Lemongrass, Palmarosa, Salaparni and Satavari. Besides, presently DMAPR is maintaining 2168 germplasm accessions of 16 species of MAPs and 331 accessions of Betel vine. In addition, 3915 number of accessions of 46 medicinal and aromatic plants are being maintained at 26 ICAR-All India Coordinated Research Projects (ICAR-AICRP) centres at different Agro-ecological Zones of the country. These centres develop Good Agricultural Practices (GAP) of medicinal plants which are brought under cultivation and commercially important.

Further, presently following Institute based projects are in operation at ICAR-DMAPR, Anand:

**Project 1:** Conservation, characterization and utilization of genetic resources of medicinal and aromatic plants for sustaining production.

**Project 2:** Genetic Improvement of medicinal and aromatic through conventional breeding and biotechnological approaches.

**Project 3:** Understanding the metabolism and biochemistry of active principles in medicinal and aromatic plants.

**Project 4:** Integrated water, nutrient management and physiological manipulation for improving productivity of medicinal and aromatic plants.

**Project 5:** Integrated pest and disease management in medicinal and aromatic plants.

**Project 6:** Bio-prospection, quality and post-harvest technology of medicinal and aromatic plants.

**Project 7:** Improving knowledge and skill of stakeholders for improving production of medicinal and aromatic crops.

**INSTITUTE'S FLAGSHIP PROGRAMME:** "Organic cultivation of medicinal and aromatic crops"

## **6. Department of Bio-technology (DBT)**

Under a programme on 'Translational Research for Developing Products and Processes from Medicinal and Aromatic Plants', Department of Biotechnology (DBT) focuses on aspects of identification of elite material and their multiplication, chemical and molecular characterization, production of secondary metabolites, developing standardized, efficacious and safe herbal products (both in AYUSH mode as well as phytopharmaceutical drugs), isolation and characterization of novel bioactive with therapeutic potential, generating genomic resources and studying biosynthetic pathways in important medicinal and aromatic plants.

**1. Central Council for Research in Ayurvedic Sciences (CCRAS)**

Following new drugs have been developed so far by the CCRAS, so far:

1.	AYUSH – 64
2.	AYUSH – 56
3.	Ksharsutra
4.	AYUSH Gutti
5.	Bala Rasayan
6.	AYUSH – 82
7.	AYUSH Candy,
8.	AYUSH Ark,
9.	AYUSH BL oil (Bala Taila),
10.	AYUSH Bala Rasayana Tablet,
11.	AYUSH PK Avleha,
12.	AYUSH BalaRakshak Leham,
13.	AYUSH PG Tablet,
14.	AYUSH SDM Tablet(Arogya Sutika),
15.	AYUSH SS Granules,
16.	AYUSH KVM Syrup,
17.	AYUSH BC Tablet,
18.	AYUSH AG Tablet,
19.	AYUSH AG Tablet,
20.	AYUSH GG Tablet,
21.	AYUSH LND Tablet,
22.	AYUSH VRG Tablet,
23.	AYUSH KD Ointment,
24.	AYUSH UT ointment

**2. Council of Scientific & Industrial Research (CSIR)**

CSIR-CIMAP has transformed into many patents and products like NBRMAP-DB, an ayurvedic proprietary medicine for diabetes. Similarly, 'Relaxomap' a pain relieving formulation based on traditional leads and validated scientifically is being marketed by more than three industries across the country.

CSIR-NBRI has recently developed an herbal formulation to alleviate urolithic and technology has been transferred to industry for its commercialization.

CSIR-CDRI has developed 4 herbal principles having medicinal importance which were patented and also commercialized, namely (i) Bacosides Enriched Standardized Extract of Bacopa for memory enhancement (ii) Gugulipid (Hypolipidemic), (iii) CONSAP (Contraceptive cream) and (iv) Reunion (for fracture healing and osteoporosis management).

## Annexure III

### **Ministry of AYUSH**

Under Central Sector Scheme for promotion of International Cooperation, (IC Scheme), the Ministry of AYUSH undertakes various measures to promote & propagate AYUSH systems of medicine including Ayurveda across the globe; and to promote Ayurvedic medicine globally. Ministry of AYUSH deputed AYUSH experts to foreign countries to participate in international meetings, conferences, training programmes, seminars and on special assignment of the Government of India for promotion and propagation of AYUSH Systems. Financial assistance is also provided for presentation of AYUSH related scientific research papers in international conferences, workshops, seminar etc.

Incentives are provided to AYUSH drug manufacturers/ entrepreneurs/ AYUSH institutions, AYUSH drug and Hospitals etc. for (a) participating in International exhibitions/ conferences/ workshops/ seminars/ road shows/ trade fairs, etc. for generating awareness amongst the participating public about the AYUSH systems of medicine and; (b) registration of AYUSH products with regulatory authorities of the foreign countries USFDA/EMEA/UK-MHRA/ NHPD (Canada)/ TGA etc. There is a provision of financial support up to Rs. 1.00 Crores for strengthening of Health Centre(s)/ Institution(s) in the foreign host country.

Ministry of AYUSH through Indian Council for Cultural Relations (ICCR) offers 104 scholarships every year to the eligible foreign nationals from 99 countries for pursuing undergraduate (UG), postgraduate (PG) and Ph. D courses in premier Institutes in India.

As of now, Ministry of AYUSH has signed 24 Country to Country MoUs for Cooperation in field of Traditional Medicine and Homoeopathy. 23 MoUs for undertaking Collaborative Research / Academic collaboration and 13 MoUs for setting up AYUSH Academic Chairs have been signed with foreign Universities. 33 AYUSH Information Cell have been set up in 30 countries to disseminate authentic information about AYUSH systems of Medicine.

### **Central Council for Research in Ayurvedic Sciences (CCRAS)**

#### **MoUs signed by CCRAS with Foreign Institutions for promotion of Ayurveda**

<b>S. No.</b>	<b>Name of the Agreement/ MoU</b>	<b>Purpose of the MoUs</b>	<b>Country</b>	<b>Date of Execution of MoU</b>
<b>1.</b>	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, the Government of the Republic of India and Rangsit University, Thailand on The Establishment of the "ACADEMIC CHAIR" in Ayurveda	ACADEMIC CHAIR in Ayurveda	Thailand	29.06.2015
<b>2.</b>	Memorandum of Understanding between Central Council for Research in Ayurvedic Science, Ministry of AYUSH, The Government of the Republic of India and Udayana University, Bali	ACADEMIC CHAIR in Ayurveda	Indonesia	04.11.2015

	on The Establishment of an Academic Chair in Ayurveda			
3.	Agreement between Central Council for Research in Ayurvedic Sciences, Republic of India and Peoples' Friendship University of Russia on Cooperation in the field of AYURVEDA	ACADEMIC CHAIR in Ayurveda	Russia	24.12.2015
4.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences Ministry of AYUSH the Government of the Republic of India and University of Promorska (Univerza na Primorskem Universita del Litorale), Slovenia on A Grant for the Visiting Professor for AYURVEDA.	ACADEMIC CHAIR in Ayurveda	Slovenia	10.03.2016
5.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, the Government of Republic of India and University of Latvia on The Establishment of an "Academic Chair" in Ayurveda	ACADEMIC CHAIR in Ayurveda	Latvia	19.08.2016
6.	Memorandum of Understanding between Central Council for Research in Ayurvedic Science, Ministry of AYUSH, the Government of the Republic of Indian and The Government of Instituto Universitario del Gran Rosario and The Government of Foundacion de Salud Ayurveda Prema on The Establishment of the an "ACADEMIC CHAIR" in Ayurveda	ACADEMIC CHAIR in Ayurveda	Argentina	30.11.2016
7.	Memorandum of Understanding between Central Council Research in Ayurvedic Sciences, Department of AYUSH, Ministry of Health & Family Welfare, The Government of the Republic of India and the University of Debrecen, Hungry on the establishment of the "ACADEMIC CHAIR" in Ayurveda	ACADEMIC CHAIR in Ayurveda	Hungry	07.01.2017
8.	Memorandum of Understanding between Central Council Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, the Government of the Republic of India and Universiti Tunku Abdul Rahman (UTAR), Malaysia, on The Establishment of an Academic Chair in Ayurveda.	ACADEMIC CHAIR in Ayurveda	Malaysia	01.04.2017
9.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences Ministry of AYUSH and University of West Indies, Trinidad and Tobago for the post of the "AYURVEDA CHAIR"	ACADEMIC CHAIR in Ayurveda	Trinidad & Tobago	06.01.2012
10.	Memorandum of Understanding between Central	ACADEMIC	Mauritius	18.03.2018

	Council Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, the Government of the Republic of India and University of Mauritius, Ministry of Education and Human Resources, Tertiary Education and Scientific Research, Mauritius, for Establishment of an Academic Chair in Ayurveda.	CHAIR in Ayurveda		
11.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, the Government of Republic of India and University of Latvia (UL) and Arya Vaidya Pharmacy, Baltics SIA (AVP) on Collaborative research project titled “ <i>A randomized double blind placebo controlled Crossover study to investigate efficacy and sustainability of individualized Ayurveda management in sub-optimally controlled Type 2 diabetes mellitus as an add on therapy to Oral drug therapy</i> ”	Collaborative research project on Ayurveda	Latvia	Yet to be signed
12.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH, Government of The Republic of India and The Medical Research Infrastructure and Health Services Fund of the Tel AVIV Sourasky Medical Center (TASMC) for Cooperation in Research and Development in the field of Ayurvedic Sciences	Cooperation in the field of Ayurveda	Israel	30.11.2016
13.	MoU between Central Council for Research in Ayurvedic Sciences (CCRAS), Ministry of AYUSH on behalf of all the research councils- Central Council for Research in Ayurvedic Sciences (CCRAS), Central Council for Research in Unani Medicine (CCRUM), Central Council for Research in Siddha (CCRS), Central Council for Research in Homeopathy (CCRH), Central Council for Research in Yoga and Naturopathy (CCRYN) and the University of Mississippi, USA, on behalf of National Centre for Natural Products Research (NCNPR) for cooperation in the field of traditional medicine.	Cooperation in the field of Traditional Medicine	USA	12.10.2015
14.	Memorandum of Understanding between India and Government of Turkmenistan for establishment of Centre of Yoga and Traditional Medicine in Ashgabat, Turkmenistan	Establishment of Centre of Yoga and Traditional Medicine	Turkmenistan	11.07.2015
15.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences, (CCRAS) Ministry of AYUSH Government of the Republic of India and University of Debrecen, Hungary (UD) on the Intention of Establishment of European Institute of Ayurvedic Sciences (EIAS)	Establishment of European Institute of Ayurvedic Sciences (EIAS)	Hungary	01.10.2017

16.	Letter of Intent between CCRAS and Office of Cancer Complementary and Alternative Medicine, National Cancer Institute, NIS, Dept of Health & Human Services.	For Cooperation in the field of Ayurveda and Cancer Research	USA	22.10.2020
17.	Memorandum of Understanding between Central Council for Research in Ayurvedic Science, on Behalf of All Research Councils, Ministry of AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy), Government of India located in New Delhi, ("CCRAS") and The Governors of the University of Alberta as Represented by the Integrative Health Institute Located in Edmonton, ALBERTA	General MoU on collaboration on various activities including Ayurveda Chair	Canada	05.12.2016
18.	Memorandum of Understanding between Central Council for Research in Ayurvedic Sciences, (CCRAS) Ministry of AYUSH Government of the Republic of India and Department of Neurology and Complementary Medicine, Lutheran Hospital, Hattingen on Cooperation in the field of Research & Education in Ayurveda.	Research and Education in Ayurveda	Germany	03.04.2019