

INTERNATIONAL JOURNAL OF PHARMACY AND ANALYTICAL RESEARCH

ISSN: 2320-2831

IJPAR |Vol.11 | Issue 1 | Jan-Mar -2022 Journal Home page: www.ijpar.com

Research article

Open Access

Council of Scientific and Industrial Research: Opportunity to the field of Pharmacy

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ABSTRACT

CSIR covers a wide spectrum of science and technology departments such as oceanography, geophysics, chemicals, drugs, genomics, biotechnology and nanotechnology to mining, aeronautics, instrumentation, environmental engineering and information technology. CSIR is the only Indian organization among the top 100 global government institutions ranked 37th among 1587 government institutions Worldwide, according to the Scimago-Institutions Ranking World Report 2021. CSIR holds the 7th rank in Asia and leads the country to the first position. CSIR has a dynamic network of 37 national laboratories, 39 outreach centres, 3 Innovation Complexes and 5 units with a pan-India presence. The notable achievement of CSIR is successfully challenged the grant of patent in USA for the use of Haldi (turmeric) for its wound healing property and insecticide. There are 21 CSIR divisions exclusively for the pharmacy related and 17 other departments. It is an integrated technology mission for the development of Ayurveda and traditional medical knowledge based on synchronized working of modern medicine & science and traditional medicine with special budgetary support. One of the funding agencies of CSIR is Golden Triangle Scheme which collaborates AYUSH – CSIR – ICMR. Only bonafide Indian citizens of 28 years with BS-4 years program/ BE/B. Tech/B. Pharma/MBBS can enter to the CSIR.

Keywords: CSIR, AYUSH, ICMR, Golden triangle.

INTRODUCTION

Council of Scientific & Industrial Research (CSIR), known for its cutting-edge Research & Development(R&D) knowledge base in diverse Science & Technology areas, contemporary R&D organization. CSIR's Research & Development expertise and experience are embodied in about 3460 active scientists supported by about 4350 scientific and technical personnel as of June 2021.CSIR has a patent portfolio of 1,132 unique patents in force, out of which 140 patents have been commercialized. CSIR also has 2,587 in force patents granted abroad in multiple countries. CSIR is the only Indian organization among the top 100 global government institutions ranked 37th among 1587 government institutions worldwide, according to the Scimago-Institutions Ranking World Report 2021. CSIR holds the 7th rank in Asia and leads the country at the first position. CSIR has a dynamic network of 37 national laboratories, 39 outreach centres,3 Innovation Complexes and 5 units with a pan-India presence.

History

At the time of Industrial Conference in 1933, Provincial Governments of Bombay, Madras, Bihar and Orissa unanimously reiterated their demand for a coordinating forum for industrial research. Lord Willingdon, the Viceroy of India at the time found it unnecessary to promote the application of research to natural resources. Instead, he offered to create an Industrial Intelligence and Research Bureau which came into operation in April 1935. When World War II broke out in 1939, the British government decided to divert funds to help the war effort. It was when Arcot Ramaswamy Mudaliar recommended that the Bureau being terminated not for economic reasons, instead to make room for a Board of Scientific and Industrial Research (BSIR). Since he was a member of the Viceroy's executive council his recommendation held sway. Constitution of Council of Scientific and Industrial Research, an autonomous body was prepared under Mudaliar & S.S.Bhatnagar came into operation on 26 September 1942. Dr. S.S.Bhatnagar DG (1894-1955) was the first president and at present by Dr.Shekhar C.Mande made to create an organisation to further the advancement in industrial research.

Objectives & Mission

- ✓ Plays an important role in Science and Technology human resource development
- ✓ Aims to provide significant technological intervention in many areas with regard to societal efforts.
- Organisation has operationalised desired mechanisms to boost entrepreneurship leading to enhanced creation and commercialisation of innovations, underpinning the development of new economic sectors.
- Managed to change the scenario of Science and Technology related opportunities.
- ✓ Science and Engineering/ science based leadership
- ✓ Innovative technology solutions &Nurturing talent in transdisciplinary area⁽¹⁾

| Name of CSIR Laboratory & location |
|--|
| Centre for Cellular and Molecular Biology (CCMB), Hyderabad, Telangana |
| Central Drug Research Institute (CDRI), Lucknow, Uttar Pradesh |
| Central Food and Technological Research Institute (CFTRI), Mysore, Karnataka |
| Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, Uttar Pradesh |
| Central Scientific Instruments Organization (CSIO), Chandigarh |
| Central Salt and Marine Chemical Research Institute (CSMCRI), Bhavnagar, Gujarat |
| Institute of Genomics and Integrative Biology (IGIB), Delhi |
| Institute of Himalayan Bioresources Technology (IHBT), Palampur, Himachal Pradesh. |
| Indian Institute of Chemical Biology (IICB), Kolkata, West Bengal |
| Indian Institute of Chemical Technology (IICT), Hyderabad, Telangana |
| Indian Institute of Integrative Medicine (IIIM), Jammu, J&K |
| Indian Institute of Toxicological Research (IITR), Lucknow, Uttar Pradesh |

Institutions Exclusive For Pharmacy⁽²⁾

| Institute of Minerals & Materials Technology (IMMT), Bhubaneswar, Orissa |
|--|
| Institute of Microbial Technology (IMTECH), Chandigarh |
| National Botanical Research Institute (NBRI), Lucknow, Uttar Pradesh |
| National Chemical Laboratory (NCL), Pune, Maharashtra |
| National Environmental Engineering -Research Institute (NEERI), Nagpur, Maharashtra |
| North-East Institute of Science and Technology (NEIST), Jorhat, Assam |
| National Institute of Interdisciplinary Science & Technology (NIIST), Thiruvananthapuram, Kerala |
| National Institute of Science Communication and Information Resources (NISCAIR), Delhi |
| National Institute of Science and Technology Development Studies (NISTADS), Delhi |

Institution of other Science

| Name of CSIR Laboratory & location |
|---|
| Advanced Materials and Processes Research Institute (AMPRI), Bhopal, Madhya Pradesh |
| Central Building Research Institute (CBRI), Roorkee, Uttarakhand |
| Central Electrochemical Research Institute (CECRI), Karaikudi, Tamil Nadu |
| Central Electronics and Engineering Research Institute (CEERI), Pilani, Rajasthan |
| Central Glass & Ceramics Research Institute (CGCRI), Kolkata, West Bengal |
| Central Institute for Mining & Fuel Research (CIMFR), Dhanbad, Jharkhand |
| Central Leather Research Institute (CLRI), Chennai, Tamil Nadu |
| Central Mechanical Engineering Research Institute (CMERI), Durgapur, West Bengal |
| Central Road Research Institute (CRRI), Delhi |
| Indian Institute of Petroleum (IIP), Dehradun, Uttarakhand |
| National Aerospace Laboratory (NAL), Bangalore, Karnataka |
| National Geographical Research Institute (NGRI), Hyderabad, Andhra Pradesh |
| National Institute of Oceanography (NIO), Goa |
| National Metallurgical Laboratory (NML), Jamshedpur, Jharkhand |
| National Physical Laboratory (NPL), Delhi |
| Structural Engineering Research Centre (SERC), Chennai, Tamil Nadu |
| CSIR Centre for Mathematical Modelling & Computer Simulation (CMMACS), Bangalore, Karnataka (2) |

Notable Achievement of the CSIR (1)(2)

- Development of the indigenously developed synthetic drug methaqualone
- Design of the first India Tractor Swaraj in 1967
- First organisation in India to analyse the genetic diversity of the tribes of Andaman and Nicobar Islands.
- Designed India's first-ever parallel processing computer Flosolver.
- Upgradation of one of India's oldest refineries at Digboi using modern distillation technology.
- Establishment of the 'Traditional Knowledge Digital Library' (TKDL) English, German, French, Japanese and Spanish
- Successfully challenged the grant of patent in the United States for use of Haldi (turmeric) for wound healing and neem as insecticide.

- Successfully completed the sequencing of the Human Genome in 2009
- In 2020, initiated clinical trials to evaluate Sepsivac's efficacy to reduce the mortality rate in **COVID-19** patients.

Functions

- The major functions of CSIR include promotion, guidance and coordination of scientific and industrial research in India.
- Establishment or development of and assistance to existing special institutions or departments for scientific study of problems affecting particular industries and trades.
- Award of fellowship.
- Utilization of Council's R&D results for industrial development.

- Collection and dissemination of S&T information.
- Technology generation, absorption and transfer.
- The Human Resource Development (HRD) Group of Council of Scientific & Industrial Research (CSIR) has a mandate to develop and nurture Science & Technology at the national level.

It also promotes, guides and co-ordinates scientific & industrial research through research grants to Scientists/Professors working in Universities/R&D Institutes of Higher learning (1)(2). opportunities available to the pharmacy related fields are given in chart 1.



Chart 1: Opportunities for the pharmacy & its related field Recruitment & Assessment Board⁽³⁾ Exam to be Qualified

CSIR and UGC provide Research Fellowships to bright the candidates for training in methods of research under expert guidance of faculty members/scientists working in University Department/National Laboratories and Institutions in various field of science. **Eligibility& age:** Only bonafide Indian citizens (28yeras) with BS-4 years program/ BE/B. Tech/B. Pharma/MBBS/Integrated BS-MS/M.Sc./MS-Ph. D program enrolled students. Subjects-Chemical/physical/mathematical/life/Atmospheric & planetary and Earth sciences.

Recruitment and assessment board of scientists (**RAB**): A full-fledged board with adequate functions and powers is set up for the purpose of selecting the scientists.

Essential Qualification: B. E/ B.Tech/M.Sc/ Postgraduation or engineering graduation with minimum 55% marks./People who are pursuing doctorate with CSIR fellowship in CSIR laboratories can also apply for these posts.

Mode of selection

Recruitment advertisement.

All the applications scrutinized by screening committee

list of candidates will be forwarded to RAB.

RAB lists the selected candidates

www.ijpar.com ~13~ Issue of appointment letters.

Approval from the Director General CSIR (3).

Funding agencies & Scheme(s) available (4)

- Emeritus Scientist Scheme / Recognition of Excellence
- ✓ Shyama Prasad Mukherjee Fellowship
- ✓ Senior Research Associateship/ Visiting Associateship Scheme
- ✓ Shanti Swarup Bhatnagar Prize
- CSIR Young Scientist Award/ Diamond Jubilee Research Interns Award Scheme
- Partial Financial Assistance for holding National/International Conferences/ symposium/ Seminar/ Workshops in India
- Partial Travel Grants/ Entrepreneurship Support to Research Scholars
- ✓ to Research Scholars
- ✓ Faculty Training Programme and Adoption of Schools and Colleges by CSIR Laboratories (4)

Golden Triangle Scheme- (CSIR- AYUSH-ICMR)⁽⁵⁾

Golden Triangle Partnership (GTP) concept emerged in a National Workshop on Ayurveda Research organized at Chitrakoot from 24th to 26th May, 2003 decided to set up an integrated technology mission for the development of Ayurveda and traditional medical knowledge based on synchronized working of modern medicine & science and traditional medicine with special budgetary support. Subsequently in a meeting on 8th July 2004, Secretary, Department of AYUSH, Director General of CSIR &ICMR decided to collaborate to achieve safe, effective and standardized classical Ayurvedic products for the diseases and to develop new Ayurvedic products of national/global importance.

Apex Committee of GTP meeting held on 18.10.05 decided to include Siddha, Unani and Homeopathy. Through its research Councils – Central Council for Research in Ayurveda and Siddha (CCRAS), Central Council for Research in Unani Medicines (CCRUM), Central Council for Research in Homeopathy (CCRH), – will work together with other two partners CSIR and ICMR.

Department of AYUSH - CCRAS- CCRUM-CCRH (Three partner responsibilities)

- To provide traditional knowledge-based matrix on Ayurveda, Siddha, Unani & Homeopathy.
- To provide leads for focusing on potential areas of research, based on the classical and contemporary texts and literatures as well as on experience-based knowledge.
- To provide concept of the pathogenesis about a disease syndrome/condition as well as approach of application of old/new formulation to achieve treatment in a particular disease condition with respect to respective AYUSH discipline.
- Department of AYUSH CCRAS- CCRUM-CCRH will also compile and provide scientific data already created through research conducted in the past by various Institutions.
- To coordinate preparation as well as supply of standardized ASHU drugs.

Council of Scientific and Industrial Research (CSIR)

- Standardization of single and poly-herbal formulations.
- Chemical and biological characterization of the drugs.
- To identify chemical and biological markers as well as biological markers in animal models /animal studies.
- Development of new drug combinations/new molecules.
- Generate safety/toxicological data.

Indian Council of Medical Research (ICMR)

- To provide information/consultation based on epidemiology &management of disease and relating to ethical issues for both basic & clinical studies respectively.
- To develop/ conduct join clinical trial protocols for evaluating ASHU formulations with the concerned experts from related research councils

& others and to validate safety and efficacy respectively.

Areas of priority

- RASAYANA (Rejuvenators // Immunomodulators) for healthy ageing
 - Manovikara Ekagrata Hani / Attention Deficit Hyperactive Disorders (ADHD) in Children
 - Manodvega / Anxiety Neurosis &AlpaSukrata / Oligospermia
 - Asthi Sushiyas / Osteoporosis
- Joint disorders: Amavata / Rheumatoid/ Osteo Arthritis & Sandhi gatavata.
- AIDS / HIV OJOKSAYA: Ojovruddhikara / Immuno – modulatory leads from Ayurveda / Siddha.
- Rajonivruti Kala janyaLakshanasammuchaya / Menopausal syndrome
- Tamakswasa / Bronchial allergy
- Klaivya&Vandhyatva / Infertility male & female
- HridayaVikara / Cardiac disorders (cardioprotective & anti-atherosclerosis)
 VyanabalaUtkshepa / Hypertension RaktagataMedoVriddhi / Dyslipidaemia
- Srama-Klamajanya Anidra sleep disorders / stress induced chronic insomnia
- Tvak Vikara / Skin disease: KittibhaKustha / psoriasis
- JirnaKaphajaAtisara / Irritable Bowel Syndrome (IBS)
- Drishti Vikara / Vision disorders
 - JaraJanyaDrshti Bindu kshaya / Senile macular degeneration (SMD)
 - Dristivitanaroga / Retinopathy
- VisamaJvara / Malaria
- Mutra vikara / Urinary Tract Diseases
 - Mutrashmari / Urolithiasis & Ashthila / Benign Prostrate Hypertrophy
 - PrarambhikaJirnaVrkkaPratighata / Early Chronic Renal Failure
- Slipada / Filariasis/Leishmaniasis
- Prameha / Diabetes mellitus
- Medovriddhi / Obesity
- Arbuda Karkatarbuda / Identified Cancer conditions
- Standardization, Safety/ Toxicity, etc. studies of Bhasmas & Rasa Kalpas etc. (Metallic & Herbomineral Preparations)

- Any other disease conditions
- Development of Pharmacopeial software
- Development of Research Council Labs as per NABL / GLP.
- Fundamental and Basic Research in ASHU disciplines

Preparations

- Rasa kalpas (Herbo-mineral preparations)
- Safety Evaluation of following 8 (eight) most widely used Bhasmas / Rasakalpas (Herbo-mineral & metallic preparations) and more are to be identified.
 - Kajjali
 - Rasa manikya
 - Rasa sindoor
 - Basant kusumaksr Rasa
 - Arogyavardhini Vati
 - Mahayogaraja Guggulu
 - Mahalaxmivilas Rasa
 - Makardhwaja
- Standardization / Drug development of prioritized disease conditions is under progress at CSIR.

Funding

- Department of AYUSH will route the funding through involved Councils as per the approval of Steering Committee.
- Three partners will provide funds from their department's existing schemes/existing heads of research/drug/standardization/clinical trials/toxicological studies etc.
- The estimated cost for developing drugs for one identified area is Rs.10 crore. Therefore, the total budgetary requirement over a period of 5 years will be in excess of Rs. 120 crores.

Steps for implementation of the project

- ✓ Identify gaps in diseases and drugs
- ✓ Brainstorming session on each disease condition to identify formulations, strengths & weaknesses & corrective measures.
- ✓ R&D in identified formulations/drugs (a) Standardization, quality control, patenting & IPR issues (b) Limited safety and toxicity evaluation – identify centres and investigators (c) Limited clinical evaluation – identify centres and investigators.

- ✓ Evaluation of safety and efficacy data
- ✓ Preparation of dossiers of effective formulations
- Interaction with the Industry for manufacturing of selected formulations
- ✓ Operational research of the selected products for implementation into health system
- ✓ Publicity & awareness strategies to take the product to masses (5)

CONCLUSION

It is concluded that pharma related fields are

available not only in industries, Science & Technology department but also in entrepreneurship notable areas.

ACKNOWLEDGEMENT

We kindly express our thanks and regards wholeheartedly to our admirable Dean, Dr.Rathinavel, MS, M.Ch, Ph.D for providing this facility to carry out this work.

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