

Details of Completed projects:

- 1. Project Title** - Screening of waterweed (Pistia and Eichornia) for its wound healing anti oxidant, anti tumor property

Principal Investigator- Dr. N. Ganesh:

Executing Agency - Jawahar Lal Nehru Cancer Hospital & Research Center, Bhopal

Objectives:

- To evaluate antioxidant, anti tumor and wound healing properties of the water weeds (*Pistia stratiotes* and *Eicohrnia crassipes*)
- To develop a drug of choice, this will be cost effective and poor man friendly.

Outcome:

The Project entailed the evaluation of active ingredients of water weeds like Pistia and Eicohrnia for their anti-oxidant, anti-tumor and wound healing properties against melanoma of Swiss albino mice. The results of the study proved that the crude extract of both water weeds had a better wound healing and anti-tumor effect and hence can be used as a cost-effective drug for cancer treatment.

2. Project Title-Therapeutic and nutritional potential of *Spirulina maxima* cultivated under electromagnetic field & different light intensities in an airlift

Principal Investigator- Dr. GBKS Prasad:

Executing Agency - Jiwaji University , Gwalior

Objectives:

- To study the effect of EMF of different intensities on *Spirulina* biomass production
- To study the effect of EMF on nutritional composition of *Spirulina maxima* in terms of essential amino acid and trace element
- To study the effect of EMF on chlorophyll content of *Spirulina maxima*
- To study the influence different light intensities (1000-1000lx) on growth and chlorophyll content of *Spirulina maxima* in an airlift bioreactor
- To study the combined effect of EMF and light on phycocyanin content of *Spirulina maxima* and its antioxidant potential
- To evaluate the antidiabetic potential of *Spirulina maxima* with different biochemical and nutritional compositions grown under different EMF and /or light intensities

Outcome:

The research aimed at evaluation of anti-diabetic, anti oxidant and anti hyperlipidmic properties of *Spirulina maxima* with special reference to its protein and beta carotene content in different electromagnetic fields and light intensities. Various studies in the lab showed the effectiveness of *Spirulina maxima* against diabetes and hyperlipidemia. Hence, *Spirulina* is a Neutra pharmaceutical having essential anti-oxidant properties.

3. Project Title-Evaluation of Anti-Arthritic properties of *Spirulina platensis* on Collagen Induced Arthritis

Principal Investigator- Dr. Surendra Singh:

Executing Agency - Jiwaji University , Gwalior

Objectives:

- Evaluation of anti-arthritic property of dietary *S.platensis* by histopathological study in experimental arthritis.
- Evaluation of anti-arthritic property of dietary *S.platensis* on humoral response of experimental arthritis by ELISA against collagen type II.
- Evaluation of anti-arthritic property of dietary *S.platensis* on cellular response of experimental arthritis by cytokine assay.
- Evaluation of the long- term effect of dietary dietary *S.platensis* on cellular response of experimental arthritis by DTH reaction.
- Evaluation of the long- term effect of dietary dietary *S.platensis* on cellular response of experimental arthritis by cell proliferation assay.

Outcome:

The objective of the research was to explore the anti-arthritic property of *Spirulina platensis* in rats. The dietary *S. platensis* showed a potential anti- arthritic response in collagen induced arthritis (CIA) in female Wistar rats. The present study concluded that dietary *S. platensis* is able to suppress the physiological, behavioral, radiological, histological, biochemical and immunological changes produced during CIA in rats. This suppressing ability of dietary *S. platensis* is due to combined effect of its antioxidant constituents such as phycocyanin, carotenoids, vitamin B₁, B₂, C and E and other micronutrients. Therefore, it can be anticipated that *Spirulina* therapy will become a more significant part of the pipeline for developing new therapeutics for rheumatic patients in the future.

4. Project Title - Germplasm conservation and microbial biodiversity preservation.

Principal Investigator- Dr. A. K. Pandey:

Executing Agency - Rani Durgavati University, Jabalpur

Objectives:

- Development of infra structure for storage of Fungi & Yeast
- Collection, Isolation & Purification of fungal cultures
- Identification of fungi on morphological basis
- Standardization of short/long-term storage
- Preparation of a checklist and pictorial guide
- Characterization of Biomolecules: Herbicidal potential, Antimicrobials & Enzymes
- Finally establishment of Regional Culture Collection & Herbarium
- Training/ workshop for students, teachers & scientists

Outcome:

This project was aimed to create germplasm conservation and microbial biodiversity preservation facility and to establish a regional culture collection and herbarium. The achievements in the project are as below:

- Infrastructure has been developed for the procurement and maintenance of the conserved microbial species for future use.
- 483 fungal isolates belonging to 61 genera were collected from different habitats of Central India and maintained for their further use.
- New fungal species discovered are *Acrodictys steviae*, *Bispora aegle*, *Cercosporidium zizyphi*.
- Fungal species were characterized on the basis of their biotechnological potential & biomolecular profiling.

5. Project Title - Gour Nodal Centre for industrially important micro-organisms (GNCIIM).

Principal Investigator- Dr. P.C. Jain:

Executing Agency - Hari Singh Gour University , Sagar

Objectives:

- To preserve and maintain the available pool of different groups of microorganisms including Fungi, Bacteria and Actinomycetes to meet out future demands of food, pharmaceutical and agriculture sectors.
- To screen microorganisms for production of bioactive molecules such as industrial enzymes, novel antibiotics, robust bionoculants etc.
- To provide study materials of academic interest and to strengthen Microbiology and Biotechnology teaching.
- To maintain potential microorganisms for industrial research and development.

Outcome:

This project was aimed to establish a nodal centre for deposition of industrially important microbes and for preservation of significant cultures for academic research and Industrial purpose. The achievements in the project are as below:

- The Centre isolated and preserved 86 strains of various Actinomycetes, Bacteria and Fungi producing enzymes of industrial significance.
- 272 isolates of actinomycetes, bacteria and fungi have been procured in GNC for future screening programme.
- A total of 59 actinomycetes from stock culture collection have been screened for their antagonistic activity. Strains Actinomycete CM 1519 & Actinomycete DOM 1548 have been found with broad spectrum of antimicrobial activity and Actinomycete CM 1517 & Actinomycete GS 1537 showed production of polyene antibiotic.
- A total of 209 Actinomycetes have been screened for the activity of L-asparagine (L-asparagine amidohydrolase E.C.3.5.1.1) which is an anti-neoplastic agent used in the acute lymphoblastic leukemia (ALL) chemotherapy. Out of 209 actinomycetes, 74 actinomycetes showed excellent L-asparaginase activity.

6. **Project Title-** Effect of certain novel active depigmentation principles from new indigenous medicinal plants w.ref.t. their applied use.

Principal Investigator- Sharique Ali:

Executing Agency - Safia College, Bhopal

Objectives:

- To phytochemically test five local traditional plants *Punica granatum*, *Ocimum americanum*, *Glycyrrhiza glabra*, *Piper sps.*, *Aloe sps.* for their depigmentation or skin whitening property i.e. plant extracts, which have the property to induce melanolysis (hypo pigmentation of skin)
- To isolate identify and characterized the melanolytic active principles or compounds from extracts of the above plants, using pharmaceutical facilities (at other R&D institutions)
- To test the identified and characterized specific principles from the above plants for their melanolytic action on the *in vivo* and *in vitro* skin melanocytes of mammals (mouse) along with specific cell lines (B16/C57) with reference to study the underlying intricate mechanism of melanin depigmentation or skin whitening without toxicological implications.
- To investigate in detail the mechanism of melanolysis (depigmentation) induced by specific plant extracted active compounds with reference to the involvement of cellular receptors/enzyme inhibitors, promoters, factors using the *in vitro* and *in vivo* animal melanocyte model (including cell line assays).
- To prepare a list of active principles with specific structure related activities for possible commercial applications as depigmentation agents.

Outcome:

The study aims to explore the nature of cellular receptors present at the melanophore membrane of animal pigment cells and their initiation by the plant extracts in induced inhibition of melanogenesis leading to melanin aggregation effects causing depigmentation and lightening of the skin. The results of the study is documented first time that plant extracts of *Aloe Vera* (leaf gel), *Punica granatum* (Fruit rind), *Osimum sanctum* (leaf), *Arachis hyupogaea* (seed skin) extract containing aloin, ellagic acid, eugenol and resveratrol respectively cause distinct melanin aggregation leading to skin lightening thereby making them the novel melanolytic candidates. Finally it is concluded that that the study opens new vistas for the use of *Aloe vera* , *Punica granatum*, *Osimum sanctum*, *Arachis hyupogaea* and their active ingredients as novel melanolytic agents which will also provide necessary information for the development of new therapeutic agents without any toxicological implications for the treatment of various hyperpigmentory skin disorder.

7. Project Title - Studies on in vitro clonal propagation of anti diabetic tree Marorphali (*Helicteres isora*) and evaluation of genetic fediality through RAPD analysis.

Principal Investigator- Y.K. Bansal:

Executing Agency - Rani Durgavati University, Jabalpur

Objectives:

- To survey, identify and collect elite plus tree material from different forest/urban sites within and around Jabalpur
- To quickly multiply selected genotypes by axillary bud/apical bud elongation under different nutritional media and seasonal conditions.
- To develop micropropagation protocol by adventitious shoot morphogenesis from both juvenile and/or mature explants of elite material under appropriate plant growth regulators (PGR) balance.
- To induce somatic embryogenesis from cultured cells/suspension under divers cultural regimes.
- Uniform elongation and development of shoot buds obtained in step 2 and 3 into healthy shoots
- Development and maturation of somatic embryos obtained in step 4
- Rooting of regenerated shoots (step 5) and whole plant formation
- Genetic analysis of in vitro plants using RAPD technique
- Hardening, acclimatization and soil transfer of plantlets obtained in step 2, 3 and 4.

Outcome:

- Conservation of medicinally important and endangered plant.
- Genetic analysis using RAPD (Random Amplification of Polymorphic DNA) technique
- Propagation of *Helicteres isore* in large number through Tissue Culture to utilize commercially for the production of drugs for dysentery and diabetes.

8. Project Title- Computational approach to prioritize drug like molecule for Chikungunya virus by exploring genomic information

Principal Investigator- Dr. Khushali Menaria

Executing Agency – MANIT, Bhopal.

Objectives:

- Total Genome sequence retrieval of Chikungunya virus (CHIKV).
- To perform gene prediction, protein structure prediction.
- Identify Sites (cavities) after analysis of protein structure.
- To design small molecules according to the cavities and perform docking study.
- Pharmacokinetics analysis, Bioactivity, ADMET & QSAR of identified molecules.

Outcome:

These set of molecules are likely to show antiviral properties against Chikungunya virus. Further studies on these molecules will lead to development of an antiviral drug. This would be the first ever medicine for curing Chikungunya fever. Patients from all over the world will be benefitted from this discovery and hence it would gain world-wide recognition for M.P for its participation in this cause. Our contribution in the arena of drug discovery will be highly acknowledged and will strongly establish Madhya Pradesh on the global drug discovery map.

9. Project Title- Establishment of an advanced laboratory for molecular characterization of chemo profiling of *Commiphora wightii* plant.

Principal Investigator- S. K. Tiwari

Executing Agency - State Forest Research Institute, Jabalpur

Objectives

- To establish advanced Molecular characterization facilities for medicinal plants.
- To standardized chemo profiling techniques through HPLC for active ingredients.
- To assess the genetic diversity of the selected species through molecular characterization.
- To demonstrate the evolved technologies under field condition.

Outcome

- Standardization of chemo profiling techniques for active ingredients in *Commiphora wightii* have been done.
- Genetic diversity of the *Commiphora wightii* plant originated from Madhya Pradesh, Rajasthan and Gujarat have been assessed through molecular characterization.
- By the above project the major stakeholders such as farmers, NGOs Forest department as well as pharmaceutical industries will be benefited as they will be provided the services like certification of medicinal herbs through Chemo profiling and molecular characterization.

10. Project Title- Isolation and purification as well as efficacy evaluation of some novel dipeptidyl peptidase (DPP-IV) inhibitors as therapeutic molecules for type II Diabetes mellitus from plant.

Principal Investigator- Dr. Rameshwar Jatwa

Executing Agency - Devi Ahilya University , Indore

Objectives

- To identify the presence of DPP- IV inhibitors in the crud extracts of some anti diabetic plants.
- To isolate and purify pharmacologically active DPP- IV inhibitors from these plants.
- To study the impact of isolated novel DPP - IV inhibitors in *in vitro* conditions and then in vivo conditions.

Outcome

- Documentations of various medicinal plants having anti diabetic properties have been done.
- DPP- IV inhibitors activity of crud extract of some anti diabetes plant have been assessed for establishment of novel anti diabetic drug
- Study has been carried out to see the impact of isolated novel DPP - IV inhibitors in *in vitro* conditions and then in vivo conditions.
- The findings of the project will help to identify plants having more potent anti diabetes properties.

11. Project Title- The study of the effect of medicinal plant Aloe vera on Hyperlipidemia and Dysfunctional free radicals in Pentamidine Isothionate induced Diabetic rats.

Principal Investigator- Dr. U. K. Chouhan

Executing Agency - Awadhesh Pratap Singh University, Rewa

Objectives

- To evaluate the Hyperlipidemia effect of natural drug (Aloe Vera) in a Pentamidine isethionate treated rates.
- To establish Aloe Vera as a standard antioxidative agent.
- To study the natural drug (aloe vera) and synthetic drug (pentamidine isethionate) interaction.

Outcome

- The antidyslipidemic and antioxidant property of *Aloe Vera* plant has been assessed in pentamidine isethionate induced diabetic dyslipidemic rats.
- It has been found that *Aloe vera* may be useful for those patients who are suffering from pneumonia are being treated with a synthetic drug pentamidine isethionate in lowering its blood glucose level.

12. Project Title- Assessment of Chemotherapeutic Properties of L-Asparaginase produced by Indigenous Bacterial Isolates

Principal Investigator- Dr. Anjana Sharma

Executing Agency - RDVV, Jabalpur.

Objectives:

- Assessment of glutaminase activity of 30 potent L asperginase
- Selection of potent L asperginase producer without gluminase activity.
- Determination of anti-tumor activity of L-asparaginase.
- Identification of anti-tumor L-asparaginase producing bacterial strain(s).
- Optimization for gross production of L-asparaginase.
- Purification and characterization of L-asparaginase with potent anti-tumor activity.
- Assessment of anti-tumor activity of purified L-asparaginase using one negative & five positive tumor cell lines.

Outcomes

- The work was based on natural bacterial diversity for the discovery of a new potent L-asparaginase producer which has similar anti-neoplastic effect as in the market available product.
- The research work has successfully done by identifying the indigenous Bacterial Isolates which produces L-Asparaginase a chemotherapeutic agent.
- Identification, optimization, purification and characterization of L-asparaginase with potent anti-tumor activity have been done.
- The property of anti tumor activity of purified L-asparaginase has also been assessed by using one negative & five positive tumor cell lines.
- The project was aimed to reduce the price of market available drug.

13. Project Title - Beekeeping-Biotechnology of Bioresources for income generation and livelihood of rural entrepreneurs on Amla Betul. **(Closed)**

Principal Investigator - Mrs. Seema Chouria:

Objectives

- To established apiary
- To established the queen rearing center.
- Processing of Bee Products.
- Marketing products by organized procedure.

Outcome

Economic condition of rural community has improved by setting the Beekeeping project.