1. International Internship for the Research Scholars

Two of the students Ms. **Karabayeva Ainur** & Mr. Mussabekov Zhankeldi from South Kazakhstan Medical Academy, Kazakhstan have visited TIFAC CORE in Herbal Drugs to carry out the internship for three month from 14th march to 29th may 2025.



1. **Internship Report Summary**

   PhD Candidate: Karabayeva Ainur

   Internship Period: 14th March – 29th May 2025



Karabayeva Ainur undertook an international scientific internship at JSS College of Pharmacy, Ooty, as part of her doctoral program. The internship commenced with a comprehensive orientation including institutional infrastructure tours and meetings with key faculty such as Dr. S.P. Dhanabal (Principal) and Dr. Shanmugam R. (Head, TIFAC CORE in Herbal Drugs). A visit to the parent institution, JSS AHER, Mysuru, offered broader insight into interdisciplinary research facilities and collaborative opportunities.

Her research focused on the pharmacognostic evaluation and phytochemical analysis of *Mausolea eriocarpa*, a medicinal plant from Kazakhstan. Initial activities included quality assessment of plant raw materials based on WHO and International Pharmacopoeia standards, confirming suitability for further analysis. She conducted qualitative phytochemical screening, identifying key constituents such as flavonoids, glycosides, tannins, and phenolic acids.

The study advanced with optimization of extraction methods using various solvents, with ethanol proving most efficient for extracting bioactive compounds. Thin Layer Chromatography (TLC) confirmed the presence of important phytochemicals including quercetin and gallic acid. In silico molecular docking was performed on quercetin, hirsutrin, and gallic acid against targets related to inflammation (COX-2), oxidation (Peroxiredoxin 1), and cancer (β-Catenin), demonstrating significant multi-target pharmacological potential, especially for quercetin.

In vitro assays validated the antioxidant, anti-inflammatory, and cytotoxic activities of the extracts, using DPPH, HRBC membrane stabilization, and MTT assays on HCT-116 cell lines. The results confirmed dose-dependent efficacy. Final separation of active constituents was achieved through flash chromatography, effectively isolating flavonoid-rich fractions.

This internship provided significant training in pharmacognostic techniques, molecular modeling, and bioactivity assays, contributing to the development of plant-based therapeutics and enhancing Karabayeva’s scientific expertise in pharmaceutical research



2. **Name:** Mussabekov Zhankeldi
   Program: PhD in Pharmacy (8D10140)
   Internship Period: 14th March – 29th May 2025

As part of the PhD program requirements, I undertook a comprehensive scientific internship at the prestigious JSS College of Pharmacy, Ooty. The program aimed to enhance competencies in phytochemical analysis, natural product research, and advanced pharmacognostic techniques, particularly focusing on the medicinal plant *Bryonia alba* sourced from Kazakhstan.

The internship began with orientation sessions and a detailed tour of research facilities including TIFAC CORE in Herbal Drugs, quality control labs, and phytochemistry units. An academic visit to the parent university, JSS AHER in Mysuru, further enriched our understanding of interdisciplinary research avenues and infrastructure.

Key scientific activities included:

- **Authentication and Quality Evaluation** of *Bryonia alba* in compliance with WHO and pharmacopoeial standards.
- **Phytochemical Screening**, revealing key bioactive groups such as alkaloids, saponins, triterpenes, and flavonoids.

- **Extraction Optimization**, where acetone proved to be the most efficient solvent using Soxhlet method.
- **TLC Profiling** for compound identification, with a methanol:water:petroleum ether mobile phase providing optimal resolution.
- **In Silico Docking Studies** on Cucurbitacin I showed strong interactions with PPAR-γ, COX-2, EGFR, and cancer-related proteins, indicating anti-inflammatory, antidiabetic, and anticancer potential.
- **In Vitro Bioassays**, including DPPH antioxidant tests, HRBC membrane stability for anti-inflammation, and MTT assay on HCT-116 cells for cytotoxicity evaluation.
- **Flash Chromatography** enabled the separation of three major fractions from *Bryonia alba* extracts for further study.

This internship offered an outstanding platform for integrating traditional medicinal knowledge with cutting-edge pharmaceutical research. It strengthened my research capabilities, provided hands-on experience in natural product standardization, and fostered international academic collaboration.