# Project Proposal for Ph.D.

## Project Details

### Project Title
Design and Development of a device for efficient removal of heavy metals from the fumes of Rasa Ausadhies during its preparation

### Project Summary

Ayurveda is a comprehensive scientific system of medicine evolved in India. Initially it was developed through ancient wisdom, clinical experiences and experimentation in a scientific manner. Ayurveda believes that no substance in the Universe is devoid of therapeutic potential, provided it is used judiciously, therefore, Plants, Minerals, Metals and Animal products serve as a basic source of Ayurvedic drugs. In Ayurveda, drugs prepared from metal & minerals are known as ‘Rasausadhi’. Minerals and metals are generally known to be potentially harmful to the human body if not processed properly. These minerals and metals are subjected to complex and meticulous processing to make them therapeutically useful and safe to the body in prescribed doses. The final product of mineral/metal drugs made with incineration is generally known as ‘Bhasma’ (calcined material) and others as ‘Rasausadhi’. Mercury (Hg) as well as other metals are important components of pharmaceutical formulations. Rigorous procedures were developed in the past to purify, detoxify and process formulations with metallic ingredients by using plant and animal materials. These processing techniques were developed to make the minerals and metals constituents in Ayurvedic Medicines useful for prescribing patients. Metals like gold, silver, copper, iron, lead, tin, Arsenic and mercury are processed in such a way that they are safe and effective. Despite evolving methods to make drugs safe for human consumption, some of the methods like making ‘Kupipakva Rasayan’ are alleged for spilling free Mercury and sulphur in the open environment. On analysing the preparation process, it was observed that there were many stages where mercury and sulphur can spill into the environment. During the mercury pretreatment and kajjali preparation stages, mercury can be spilled out in the environment. Also, the personnel deployed are at a great risk of mercury exposure. To combat this, a closed chamber can be constructed with mercury capturing fabrics. This helps in capturing mercury and thus preventing its spillage in the open environment. Subsequently there are more procedures involved in the preparation of ‘Rasausadhi’, which needs to take care of spillage and usage issues. The project is intended to design and develop certain operations and devices for betterment of medicine preparation in the domain.

## Ph.D. Supervisors

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<tr>
<th>Role</th>
<th>Faculty</th>
<th>Academic Unit in IITD/Institute/University</th>
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<tbody>
<tr>
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Project requirements (Student qualifications, experience required, etc)

- B.A.M.S. degree and M.D degree in the appropriate discipline.
- Desirable -3 Year experience in the field of research.

Source of fellowship/funding
(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

IRD (Design and Development of a device for efficient removal of heavy metals from the fumes of Rasa Ausadhies during its preparation) RP04350

Role of Faculty Members involved:

Prof Sumer Singh has a background in Industrial Design and has extensively worked for design and development of products which can be used in actual user environment. He has also worked in past for design and development of products related to Ayurveda.

Prof Surya Prakash Singh, has a background in Mechanical Engineering and manufacturing and further in the area of Operations Research. He has worked extensively for design and development of decision support system which has been implemented in various fields.

The research will entail proposal of Frameworks/ Decision support system for ayurvedic practices.