



Project Proposal for Ph.D.

Project Details (The research problem must clearly indicate the need for an interdisciplinary approach)	
Project Title	Atmospheric Cold Plasma for Decontamination of Fungi and Mycotoxins in Indian Spices
Project Summary (Minimum 500 and maximum 2000 characters)	Spices are imported worldwide mainly from developing countries with tropical and/or subtropical climate. In spite of potential health benefits, spices are often susceptible to toxigenic microfungi growth and thus potential mycotoxin development. Mycotoxins, one of the most serious of natural origin, are produced by toxigenic microfungi, mostly by Aspergillus, Penicillium, and Fusarium and to a certain extent Alternaria genera as their secondary metabolites. Worldwide, spices are rather overlooked in terms of mycotoxin regulations, which usually only cover aflatoxins (AFs) and ochratoxin A (OTA). The common methods employed to remove mycotoxins include physical, and chemical, enzymatic and microbial decontamination methods. Unfortunately, these methods can be inaccurate, unreliable, laborious, time consuming, and not suitable for inline measurement. It is worthwhile noting that the traditional mycotoxin degradation methods can take long processing time for effective mycotoxin reduction, hence not energy efficient and expensive. Even though several methods have been proposed to degrade mycotoxins in foods, the food industry continues to seek a rapid and effective technology. Therefore, the aim of this proposal is design and development of an atmosphere cold plasma based non thermal technology for the decontamination of fungi and mycotoxins of major spices harnessing their safety and quality attributes.

Ph.D. Supervisors* (Supervisor 1 and Supervisor 2 cannot be from the same department of IITD)			
Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1*	Jatindra K Sahu	CRDT	jksahu@iitd.ac.in
Supervisor 2	Satyananda Kar	DESE	satyananda@dese.iitd.ac.in

*Supervisor 1 must be from IIT, Delhi.
+All cells in this table are mandatory fields that need to be filled by faculty for consideration of proposal.
\$The date of superannuation of supervisors should be at least three years from the date of registration of selected candidates.

Project requirements (Student qualifications, experience required, etc) *The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)
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- PG in Biotechnology/Biochemistry/Biochemical Engineering/Chemical Engineering/Food Process Engineering
- Other requirements like MTech/MSc (GATE/NET) as per IIT Delhi admission process

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

Candidate with his/her own fellowship.

Role of Faculty Members involved:

Supervisor-1	Assessment of Atmosphere cold plasma system on decontamination of fungi and mycotoxins of major spices. Atmosphere cold plasma induced mathematical modelling and simulation on inactivation kinetics of fungi and mycotoxins of spices. Atmosphere cold plasma included volatile and colour change understanding, predictive modelling and simulation of spices.
Supervisor-2	Design and development of an atmospheric cold plasma system with different frequencies, evaluation of techno-economic aspects of the system and scale-up.

- Note :-**
1. Approval from the respective DRC/CRC/ScRC of your Department/Centre/School will be required for using the "Full-time Institute Assistantship (Category-wise) (FIA)" for selecting the students in SRe.
 2. Declaration:- Faculty members, please ensure that you have at least 3 years of service left before superannuation along with adequate sitting space & lab facilities for the SRe student.
 3. PI/s are also encouraged to submit joint proposals with AIIMS, NII, JNU and institutes with which IITD has an existing MoU. If the Co-PI (Supervisor 2) is from outside IITD, kindly share his/her detailed CV.
 4. If a research scholar is to be considered for selection under the project fellowship, then the project should have a minimum of two-year duration remaining.
 5. A candidate applying with a valid JRF/INSPIRE/any national level fellowship should have at least two-year validity from the date of joining the Ph.D. program.
 6. The third supervisor’s name (if required) can be added only after the formation of Student Research Committee (SRC) subject to a strong recommendation of SRC and subsequent approval from the competent authority.
 7. If Institute fellowship is being sought, then DRC approval of the parent department of Supervisor 1 is required at the time of selection.