



Project Proposal for Ph.D.

Project Details	
Project Title	Studies on natural fibre-based mulch covers for applications in AgroTextiles
Project Summary (Minimum 500 and maximum 2000 characters)	Agrotextiles, a type of technical textile, play an important role in protecting crops from extreme climate. For example, the polyethylene plastic mulch covers are extensively used in farming to raise soil temperature, retain soil moisture, reduce weed growth, and increase crop yield. However, they are also associated with production of environmental pollutants, potential threat to human health besides additional financial burden of disposal after use. The fragments of polyethylene films remain in the soil for longer time due to difficulty in degradation, which subsequently lead to contamination of land and decrease in crop yield. It has been reported that crop yield is decreased around 11–13% in maize, 9–10% in wheat, 8%–14% in rice and 5.5–9 % in soybean when soil contained 58.5 kg ha ⁻¹ of residual plastic film. Therefore, there is growing interest to use biodegradable mulch covers to mitigate the negative effects of polyethylene mulch. The proposed study on natural fibre-based mulch covers is very relevant to address the current demands of agriculture industry and organic farming. The goal of this research is to develop natural fibre-based nonwovens that are durable throughout the growing season of crop and then rapidly disintegrate in the field when a breakdown treatment is performed.

Ph.D. Supervisors			
Role	Name of Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. V.N. Baheti	Textile and Fibre Engineering	baheti@iitd.ac.in
Supervisor 2	Prof. Vasant Matsagar	Civil Engineering	matsagar@civil.iitd.ac.in

Project requirements (Student qualifications, experience required, etc) *The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)
- M.Tech (Textile Engineering, Fibre science or Textile chemistry) - Experience on AgroTextiles is preferred

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

Role of Faculty Members involved:	
Supervisor-1	Prof. V.N. Baheti: Natural fibre surface modification, textile structures for mulching, needlepunching, electrospinning, characterization of transmission properties
Supervisor-2	Prof. Vasant Matsagar: Characterization of soil properties with and without mulching, Effect of soil conditions on agrotextile performance