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		23rd August 2012 onwards	Up to 21st August 2012
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7.	Brief account of your research interests with special focus on Nano Science and Technology (strictly within 300 words):	<p>Presently, I am working on “Bactericidal Nano-functionalized Biodegradable Corn Zein Polymers as Shelf-life Extending Food Packaging Materials” at Iowa State University of Science and Technology, Ames-50011, Iowa, USA as BOYSCAST Fellow (DST) / Visiting Scientist.</p> <p>Primary causes for the deterioration of food quality are oxidative processes and microbial spoilage. With active packaging technology, interactions of food, packaging material and the internal environment are taken into consideration. This has led to an interest in the use of films with Nano particle/ bio-nano-composites having antimicrobial activities. Preparation of protein and starch based nano-functionalized biopolymers/ films/ coating such as whey protein, corn protein and soy proteins as well as starch with enhanced properties. Develop protein and starch based films with nanoparticles either embedded into the polymer matrix, or cross-linked or attached onto the film surface. Also know the optimum concentration of nanoparticles that can be incorporated to the film without affecting essential film properties. Evaluate</p>	

		<p>protein and starch -based bionanofilms for effects on quality and shelf-life extension of fresh produce during storage. Optimization of the functionalities of bactericidal photocatalysts. Protein and starch could be utilized in preparation of coatings and films at various processing conditions such as Sonication levels, Nano particles and protein/ starch loading (thickness) etc. To characterize protein / starch based biodegradable films for mechanical and antimicrobial properties. Use of nanomaterials with antimicrobial properties could produce films and coatings with better mechanical and barrier properties. For example, Titanium dioxide (TiO₂) in silica (SiO₂) core-shell nanomaterial can be incorporated in protein or starch matrix to reduced risk of pathogenic organisms contaminating foods (processing and post-processing surfaces) and food packaging. As food production becomes increasingly automated, the number of surfaces with which foods comes into contact and the subsequent potential for contamination increases. The antimicrobial coating of such surfaces could potentially reduce chances of contamination. Most functional ingredients used in packages for antioxidant and antimicrobial purposes are certain organic compounds, such as butylated hydroxytoluene, a-tocopherol, nisin or benzoate, organic acids and enzymes. These active packaging materials have been shown to suppress oxidation in model systems of meat or oil products, as well as to inhibit microbial growth in food products. Characterization will be carried out using particle size analyzer, compound light microscope, compound stereo light microscope, Scanning Electron Microscope (SEM), colour profile, texture attributes, mechanical properties, viscosity/ rheology, DSC, DMA, TGA, Goniometer etc.</p>
8.	<p>Keywords related to your research interests (maximum 10, different lines separated by commas)</p>	<p>Biofilms, Surface coating, Protein and Starch, Nano- material, Nano-functionalized, Biodegradable, Food package, Anti-microbial, Storage, Characterization.</p>

(Dattatreya M Kadam)