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Uptake and translocation of bio-based polymer in plant tissue

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In recent years interest in bio-based polymers has accelerated because of its renewable and biodegradable properties. However, the first generation bio-based polymers were mostly derived from agricultural feedstocks which contradict directly with human food demand. There is limited research in isolating bio-based polymers from crop wastes and their utilization in plant system. Our ultimate goal is to isolate plant polymer, xylan from wheat bran. After characterization of the polymer using spectroscopic and chromatographic techniques, chemical functionalization of xylan hydroxyl groups was carried out to form a type of nanoparticles within the size range of 50-100 nanometer (nm). These particles function as extremely small nanocapsules and will be used to encapsulate micronutrients for delivering into plant cells. In this preliminary work, to understand the uptake and translocation of bio-based polymer in plant system, we prepared a Poly (lactic-co-glycolic acid) nanoparticles (NP) tagged with Alexa Fluor 647 dye and applied to germinating seeds of common bean. Analyzing the polymers treated and non-treated tissue of germinated seeds using confocal microscopy, we observed differential uptake and translocation of Alexa Fluor 647 dye bound polymer in common bean tissues.

Biography

Khwaja Hossain did his PhD in Molecular Biology, University of Wales, Aberystwyth, UK, 1995. MS in Genetics and Plant Breeding, Bangladesh Agricultural University, 1989. BS in Agricultural Sciences, Bangladesh Agricultural University, 1985. He is currently working as professor of biology- Division of Science and Mathematics, Mayville State University (MSU), Mayville, ND. July 2015 – Present.

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