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Bioeconomy for new solutions in biomedical technology: Chiang Mai University experiences

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Abstract:

The development of a bioeconomy has great potential for the local production of biomedical polymers in Thailand. Chiang Mai University's innovation aims to utilize Thailand's abundant raw materials to strengthen the country's Bioplastics industry in order to become a leader in the region. Specialty medical-grade polyesters for use as biomaterials in both long-term and short-term implants according to ASTM F1925-09 guidelines (Standard Specification for Semi-Crystalline Polylactide Polymer and Copolymer Resins for Surgical Implants) can now be synthesized and characterized to meet the specific requirements of various biomedical applications using CMU's novel initiator in a purpose-designed clean room with ISO13485 (Medical devices - Quality management systems - Requirements for regulatory purposes) accreditation. This know-how is gradually being developed through a combination of basic and applied research and is supported by our close collaboration with the PTT Public Company Limited, Thailand. The next step of this research is aimed primarily at developing cost-effective absorbable monofilament surgical sutures which can be commercially produced at a price which Thai hospitals can afford. Prototypes are being fabricated with properties designed to meet both the stringent requirements of the application as well as the practical needs of the surgeon.

Reference:

1. Puttinan Meepowpan Winita Punyodom Robert Molloy, Process for the Preparation of Liquid Tin(II) Alkoxides, US Pat. 9,637,507 B2 (May 2017), JP Pat. 6246225 (November 2017), CN Pat. 104903333B (January 2018)



Assistant Professor Dr. Winita Punyodom obtained her PhD (Polymer Physics) from the University of Leeds, UK. Her main research interests are in the field of biodegradable polymers for use in the biomedical and bioplastics industries. This includes the synthesis of specialty polyesters with controlled microstructures, novel initiators, and the study of the kinetics and mechanisms of the ring-opening polymerization of cyclic esters. This basic research has led to applied research in biomedical applications such as absorbable monofilament surgical sutures and nerve guides. The work of Winita and her team has been recognized by the National Research Council of Thailand (NRCT) with the award of a 2014 Invention Award and a Chiang Mai University (CMU) 2017 Gold Elephant Outstanding Technologist and Invention Award.