THE UNIVERSITY OF MEMPHIS | Office of Technology Transfer

FedEx Institute of Technology, The University of Memphis

TREATMENT PROCESS TAILORS DEGRADATION RATE OF IMPLANTABLE BIOPOLYMER CHITOSAN

Biomedical applications are growing for chitosan, a natural polymer derived from shells of crustaceans. These applications include wound care, drug delivery, infection prevention, and dental applications. An advantage of chitosan in biomedical applications is its biodegradability. The duration of implanted materials required for intended function varies by application. For instance, a drug delivery vehicle should biodegrade as the drug is expended and tissue engineering scaffolds should degrade as native tissue heals. This invention includes methods for processing chitosan materials to tailor the degradation rate for specific applications.

APPLICATIONS

- Local delivery of therapeutics through sponges
- Bone regeneration scaffolds
- Injectable wound infection prevention
- Wound care materials
- Guided tissue regeneration

ADVANTAGES

- Range of processing parameters allows for “dialing in” of degradation.
- Biocompatible solvents and materials
- Broadly applicable to chitosan biomaterials

Hai Trieu || Office of Technology Transfer || 901.678.1712 || hhtrieu@memphis.edu

ELUTION DATA

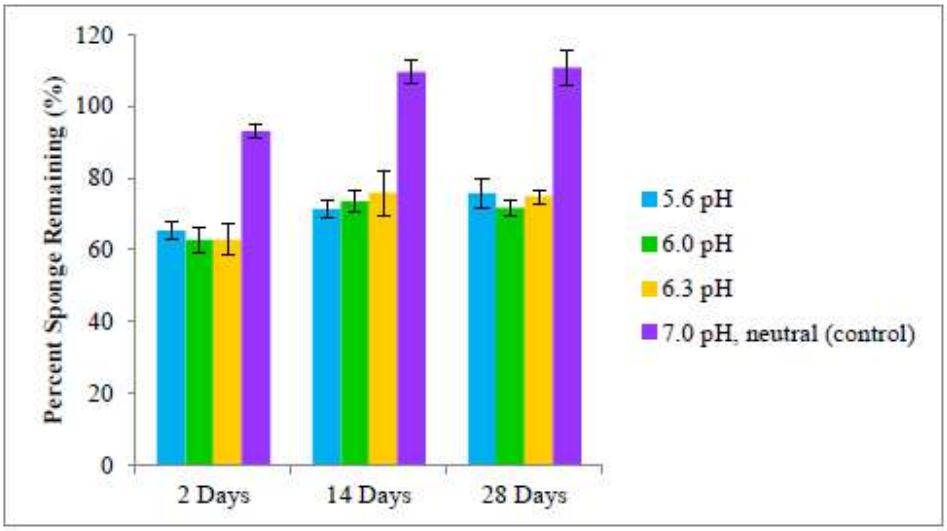


Figure 6. Percent sponge remaining after *in vitro* lysozyme based degradation (n = 3).

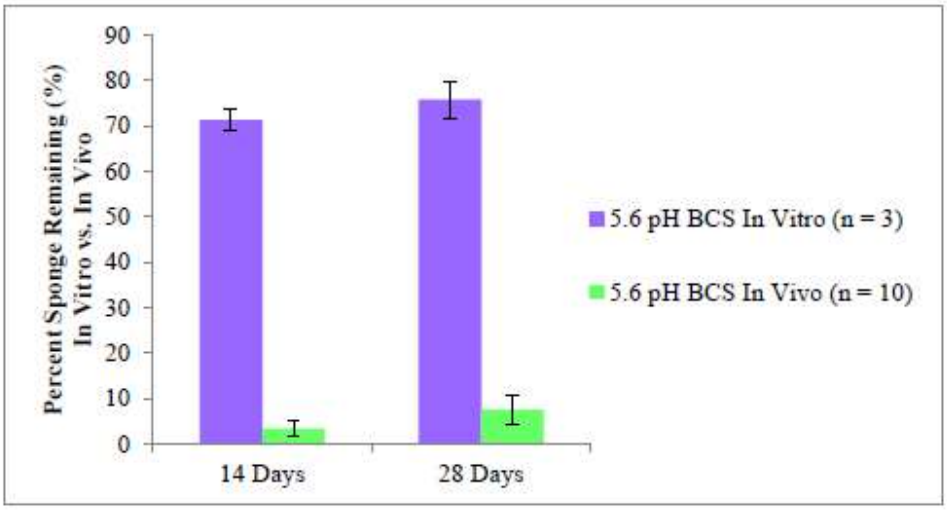
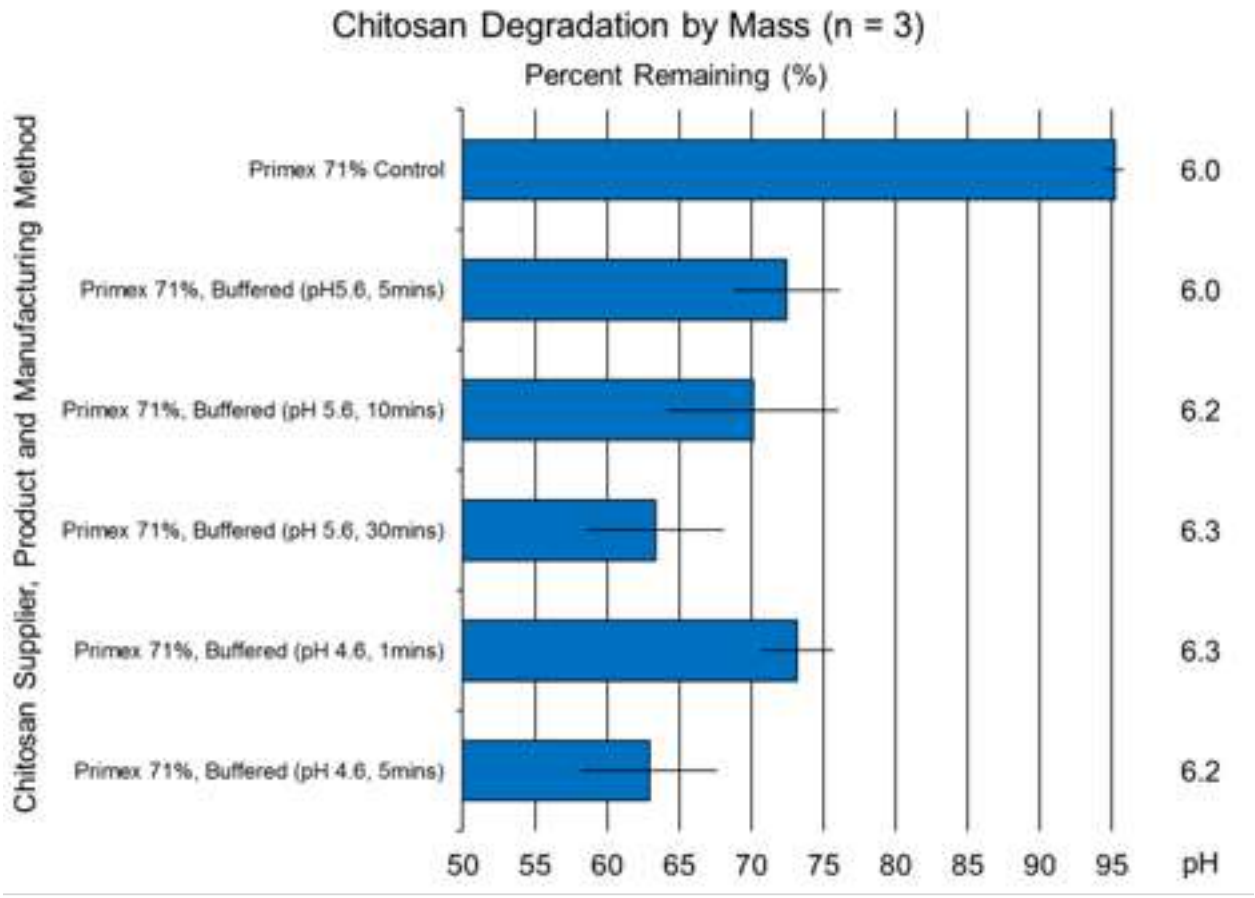


Figure 7. Percent 5.6 pH buffered Chitopharm S sponge remaining after *in vitro* lysozyme based degradation (n = 3) and *in vivo* degradation (n = 10) after 14 and 28 days.



Hai Trieu || Office of Technology Transfer || 901.678.1712 || hhtrieu@memphis.edu

THE UNIVERSITY OF MEMPHIS | Office of Technology Transfer

FedEx Institute of Technology, The University of Memphis

THE INVENTORS

Dr. Ashley Parker is currently a Research & Development Engineer at MicroPort Orthopedics Inc. She received her Ph.D. and M.S. in Biomedical Engineering from the University of Memphis under the supervision of Dr. Warren Haggard in 2014 and 2011. While at the University of Memphis, Ashley was a National Science Foundation Graduate Research Fellow. She also received her B.S. in Polymers and High Performance Materials from the University of Southern Mississippi in 2009.

Dr. Ashley Parker

Dr. Amber Jennings is currently Research Assistant Professor in Biomedical Engineering at the University of Memphis. She received the Ph.D. in Biomedical Engineering from the University of Alabama at Birmingham in 2007. Her funded research focuses on infection control and novel biomaterials. She has published numerous research papers in peer reviewed journals. She is an active member of the Society for Biomaterials, the Orthopaedic Research Society and the Council for Undergraduate Research.

Dr. Amber Jennings

Dr. Warren O. Haggard is the Associate Dean of Research for the Herff College of Engineering and a Professor and Herff Chair of Excellence in Biomedical Engineering at the University of Memphis. He has a Ph.D. in Biomedical Engineering from University of Alabama at Birmingham. His research interests are focused on bone graft substitutes, functional tissue repair and local drug delivery for complex extremity trauma with emphasis on musculoskeletal applications. Dr. Haggard's current investigations are local antibiotic delivery to prevent bone infections, intelligent drug delivery systems, and functional musculoskeletal hard/soft tissue repair. He has translated two technologies from his university laboratory to local medical device companies.

Dr. Warren O. Haggard

Hai Trieu || Office of Technology Transfer || 901.678.1712 || hhtrieu@memphis.edu