SAMUEL TETTEH-QUARSHIE, Dept of Biomedical Sciences, Marshall University School of Medicine, Huntington, WV, 25701, TIMOTHY LONG, and CYNTHIA B. JONES, Dept of Pharmaceutical Science and Research, Marshall University School of Pharmacy, Huntington, WV, 25701. **Exploring rheological properties of chitosan gel and antimicrobial activities of 5-FU against diabetic wound pathogens**

Diabetic skin wound is a common complication that occurs in about 15% of diabetic patients and often requires prolonged hospitalization. Diabetic wounds are slow to heal and last for weeks, making it difficult to manage. Chitosan has become a focus of attention in delivering therapeutics such as antimicrobial agents to site of action in diabetic wounds without negative side effects. The objective of this study was to explore rheological properties of CS gel and determine the therapeutic effects of 5-FU against common diabetic wound pathogens.

Chitosan gel (2% w/w) was prepared in serial dilutions of 5-FU. Stability, antimicrobial activities, and rheological properties (flow behavior and oscillatory sweep tests) of 5-FU-CS gels were analyzed.

2% CS gel demonstrated a shear thinning behavior with a flow index < 1. The gel displayed weak gel-like properties with storage modulus values (G’) less than loss modulus values (G”). Stability (pH) was maintained after three weeks of storage at 4-8oC and 20-25oC. Unlike *E. coli*, 5-FU and 5-FU-CS gel significantly inhibited MRSA and RN1 growth. Drug-free CS gel had no growth inhibition against MRSA, RN1 or *E.* *coli*. The MIC for 5- FU against MRSA, RN1, and *E. coli* were 0.5μg/mL, 0.5μg/mL, and 8.0μg/mL, respectively.

CS was successfully formulated into non-Newtonian gel with shear thinning properties. The gel was viscous and less elastic. 5-FU-CS gel was stable at both room and cold temperatures after three weeks of storage, with antimicrobial activities against MRSA and RN1 at low concentrations, and against *E. coli* at higher concentrations.

Understanding rheological properties of CS would enhance its utilization as a drug delivery vehicle for diabetic wounds given its biodegradable, biocompatible, and biological properties.