

# TRANSDERMAL LONG ACTING DELIVERY OF FLUPHENAZINE DECANOATE USING NOVEL POLYMERIC DISSOLVING MICRONEEDLE SYSTEMS.



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## Background:

Schizophrenia can be defined as a disturbance that must last for six months or longer, including one month of delusions, hallucinations, disorganized speech, grossly disorganized or negative symptoms<sup>1</sup>. Despite the critical importance of medication, nonadherence has been recognized as a problem worldwide and maybe the most challenging aspect of treating patients with schizophrenia<sup>2</sup>. Enhancing adherence to antipsychotic medications has the potential to reduce psychiatric morbidity and costs of care substantially<sup>3</sup>. Fluphenazine Decanoate (FLU-D) is one of the long-acting antipsychotics used as a maintenance treatment of schizophrenia, it is administered as an intramuscular injection every 14-35 days<sup>4</sup>. This long-acting injectable delivery system has overcome plasma drug fluctuations associated with the oral daily intake of the drug. However, FLU-D requires a professional health care provider and specific administration procedures. In addition to the pain and inconvenience of the typical hypodermic needle. Transdermal long-acting delivery of FLU-D using dissolving microneedle MN system has the potential to provide convenient noninvasive long-acting delivery of this lipophilic antipsychotic.

## Methods:

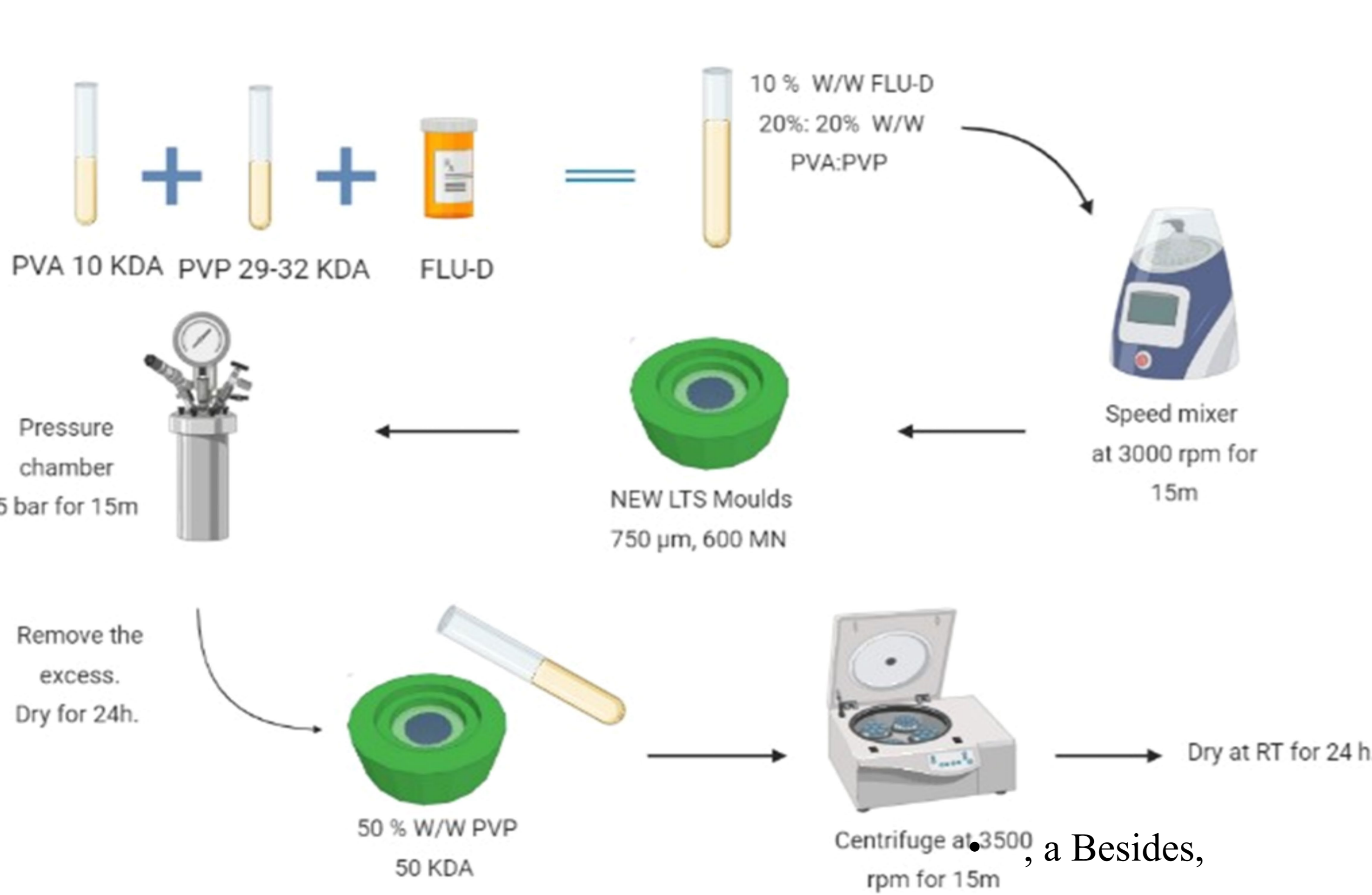


Figure 1: Preparation method of FLU-D Loaded Dissolving MNS

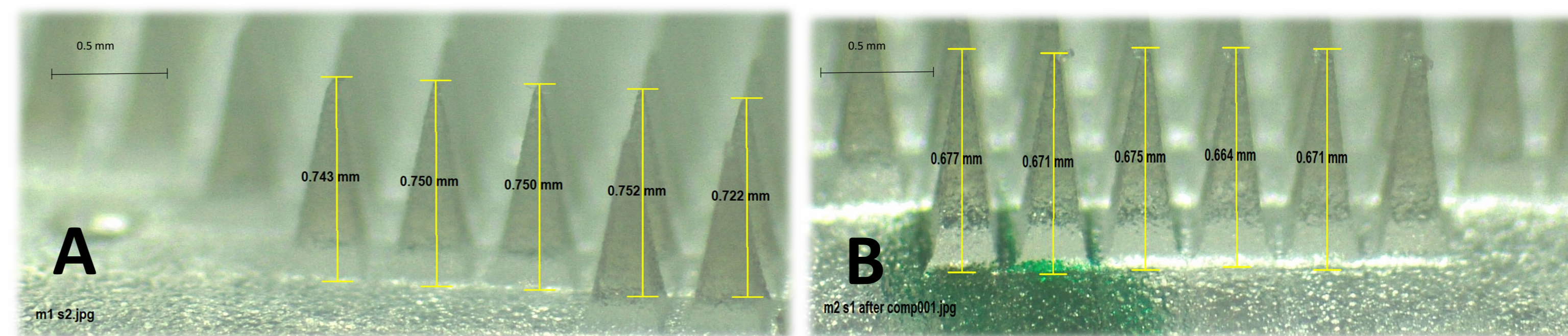


Figure 3: MNs before (A) and after (B) compression Force Test

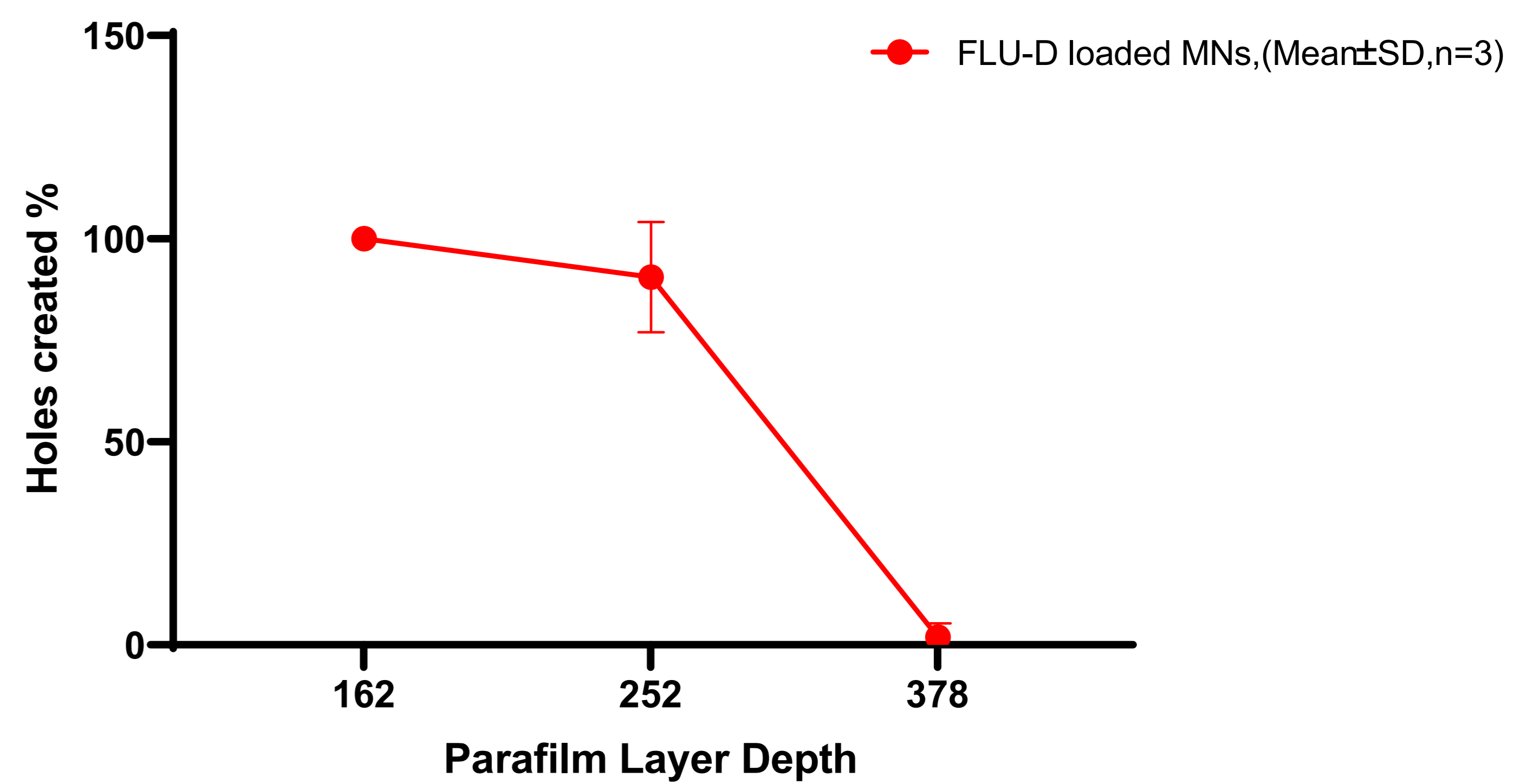


Figure 4: Mean of Holes created % after applying Parafilm.M Insertion test

- To evaluate the physical ability of the MNs, A compression force test was performed by a TA.XT2 Texture analyser. The height of individual MNs was measured using Leica EZ4W stereo microscope before and after the test to determine the reduction of MNs height.
- To evaluate the insertion ability, MNs were inserted into full-thickness porcine skin manually and Optical coherence tomography (OCT) images were taken.
- Further, drug content in MNs was determined using a validated High performance liquid chromatography (HPLC) method.

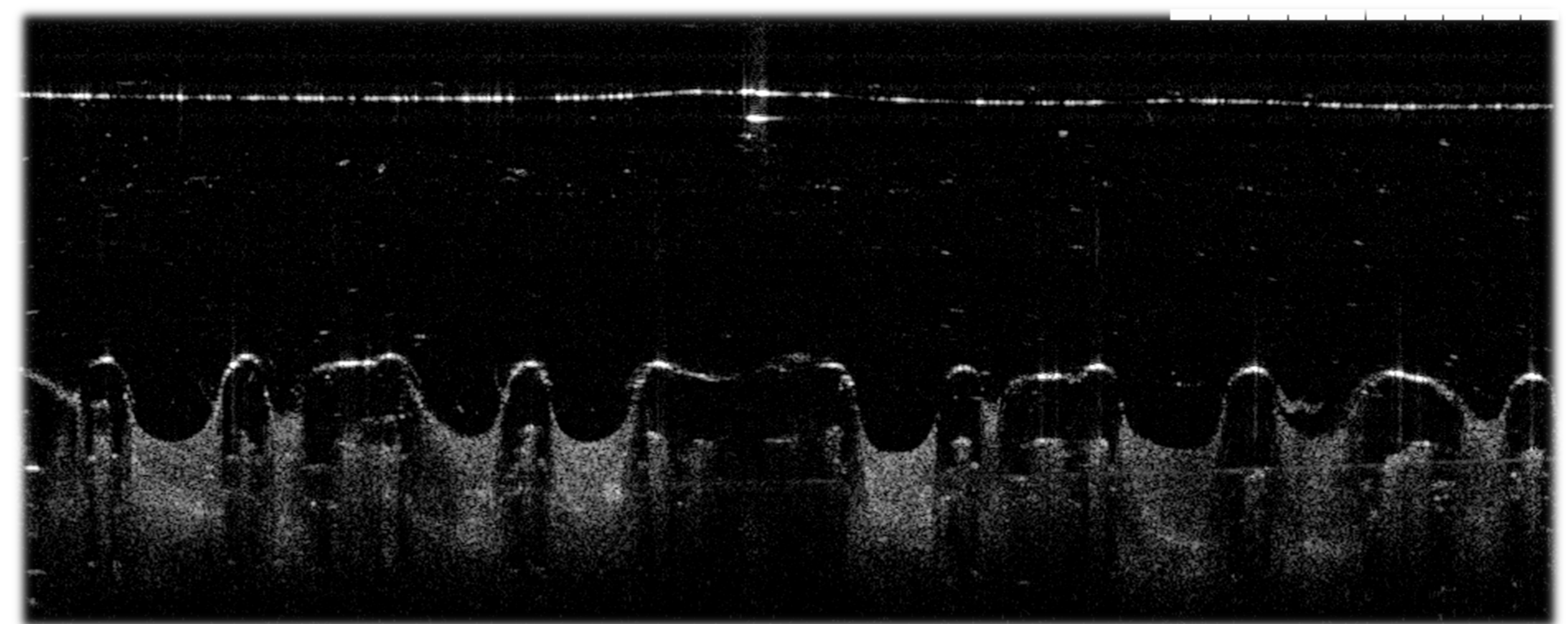


Figure 5: Representative OCT images for Drug loaded MNs following insertion to Full-Thickness Porcine Skin

## Results:

- FLU-D loaded dissolving MNs showed good physical and insertion properties, the mean of %height reduction is  $5.23 \pm 0.91$  and OCT images showed that the mean of inserted length is  $528.05 \pm 20.48 \mu\text{m}$ . In terms of drug content in MNs  $0.99 \pm 0.18 \text{ mg}$  per array was found.

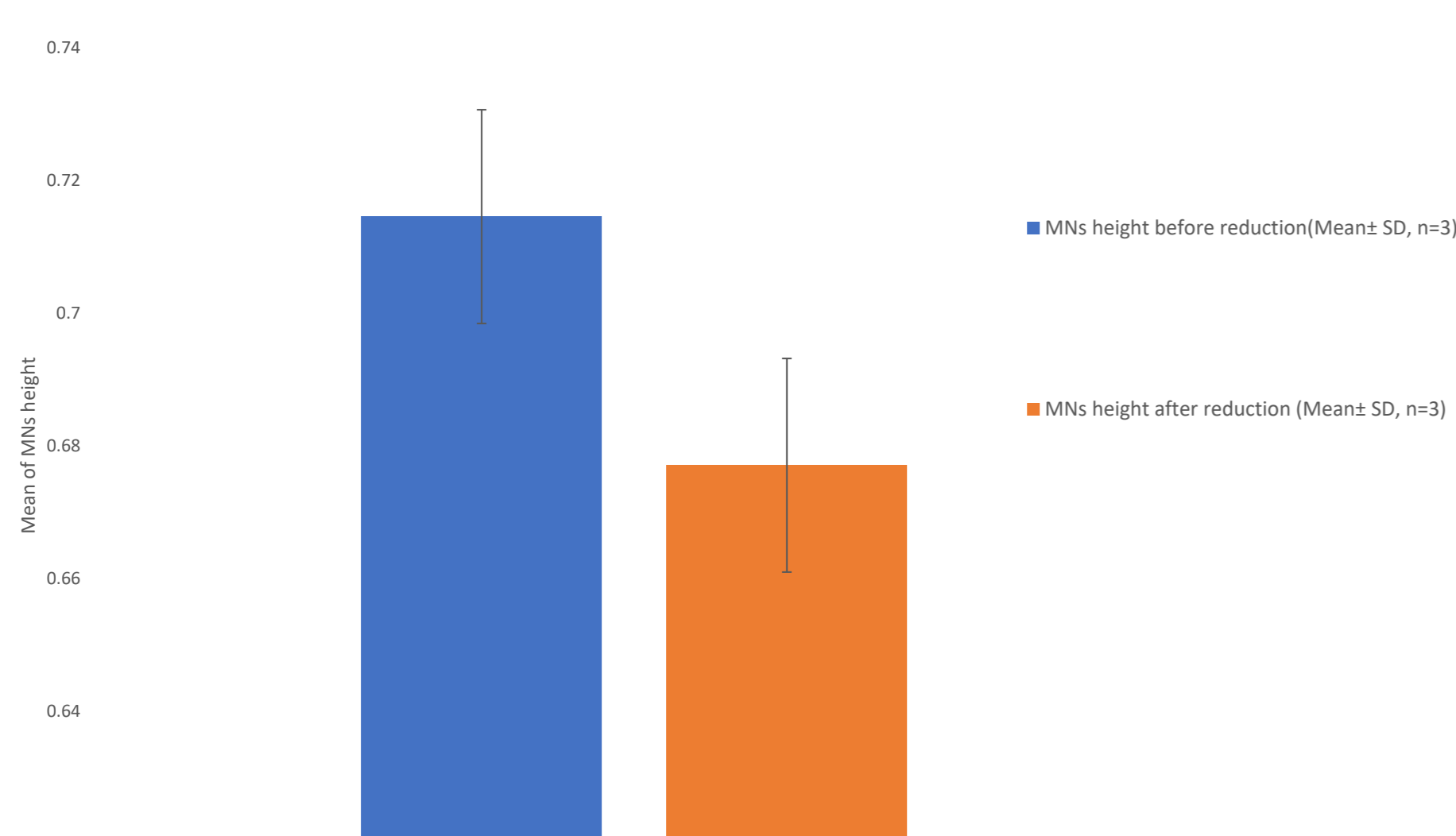


Figure 1: Percentage of MNs height reduction after Compression Force Test using Texture Analyzer.

## Conclusions:

- A promising FLU-D loaded dissolving microneedles system has been developed. The viable physical and insertion properties of this system have been proved in addition to the drug content. Further in-vitro studies are required to address the drug release.

## References

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