

Supplementary Files

Quercetin Nanocrystal Loaded Alginate Hydrogel Patch for Wound Healing Application

Malay Nayak,^{#,a} Vivek Kumar,^{#,a} Durba Banerjee,^a Lipi Pradhan,^a Prajwal Kamath,^a Sudip

a. School of Biomedical Engineering, IIT (BHU), Varanasi, 221005, UP, India.

#Equal Contributing first Author

*Corresponding and Communicating author: Dr. Sudip Mukherjee, sudip.bme@iitbhu.ac.in, Phone Number: +91-7980659213.

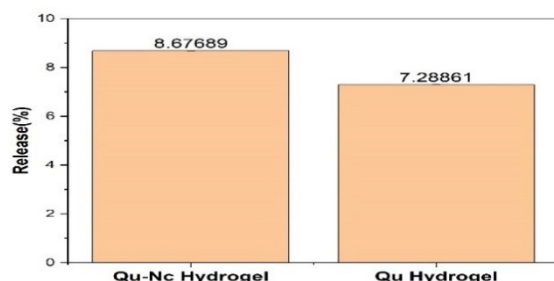
Mukherjee*^a

Methods:

- Rheological Property Measurements:** Rheological properties of the synthesized hydrogel were investigated using an Anton-Paar MCR 72 rheometer. Dynamic oscillatory tests, including amplitude and frequency sweeps, were performed to determine the linear viscoelastic range (LVER) and viscoelastic behaviour. Amplitude Sweep: A constant frequency of 10 rad/s was applied to identify the LVR, where the storage modulus (G') and loss modulus (G'') remain linear with increasing strain. Frequency Sweep: Within the LVR, a constant strain of 1% was applied, and the frequency was varied from 0.1 to 10 rad/s. This test characterized the frequency-dependent behaviour of the hydrogel and provided insights into its structural properties. Shear Rate Sweep: To assess the shear thinning behaviour, the hydrogel was subjected to a range of shear rates from 0.1 to 100 s^{-1} .
- Cell viability assay:** To evaluate the biocompatibility of the hydrogels, HEK-293T cells were seeded in 24-well plates and treated with the blank hydrogels and Qu-NC hydrogels for 24 hours. Cell viability was assessed using the MTT assay, which measures the metabolic activity of cells. After incubation with MTT solution, the formed formazan crystals were dissolved in DMSO, and the absorbance was measured at 595 nm. Cell viability was calculated relative to a control group in percentage.

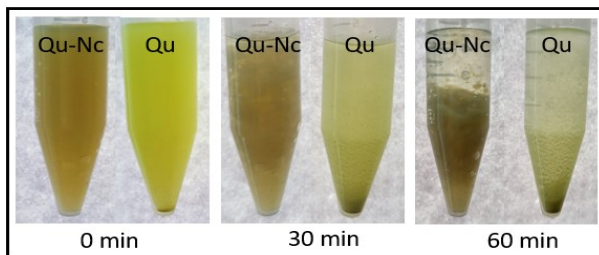
Supplementary

Figure1:



Supplementary Figure 1: Release percentage of drug from Qu-Nc Hydrogel and Qu Hydrogel in 24hr.

Supplementary Figure2:



Supplementary Figure 2: Solubility test of Qu-Nc and Qu at different time point

Supplementary Figure3:

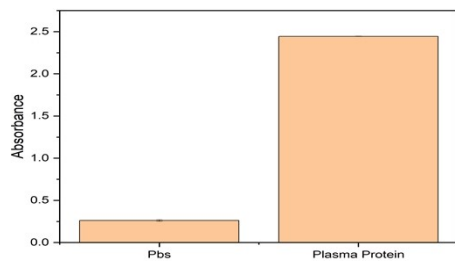
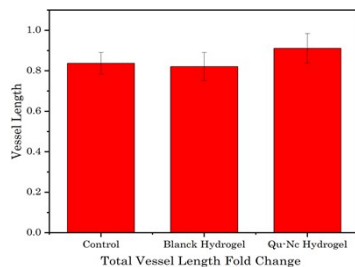
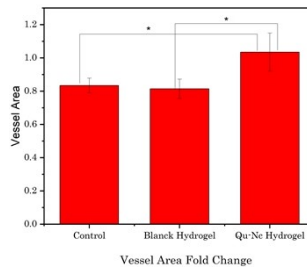


Figure 3: Release of Qu-Nc in Plasma protein and Pbs of 24hr time point

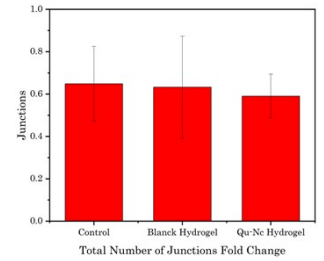
Supplementary Figure 4



Supplementary Figure 4 (A):
Total Vessel length fold
change

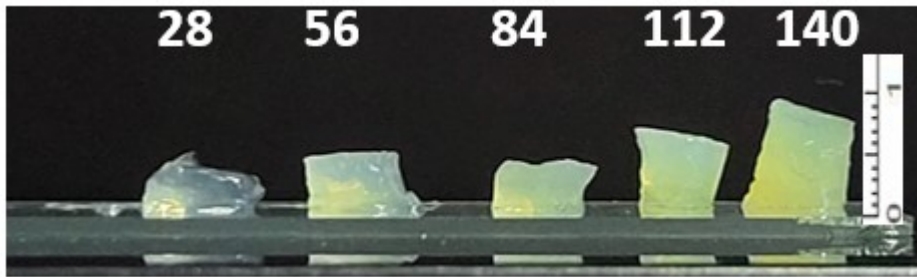


Supplementary Figure4(B):
Vessel area fold change



Supplementary Figure 4(C):
Total number of junction fold
change

Supplementary Figure 5:



Supplementary Figure 5: Swelling image of Hydrogel patch containing 28,56,84,112,140 ug of Quercetin