Abstract

Curcumin (CUR) has been traditionally used as a wound healing agent, thus, is a good wound dressing agent. To further enhance anti-bacterial prevention, levofloxacin (LEVO) is considered as it has high effectiveness towards both gram-positive and gram-negative bacteria. CUR and LEVO are added to ethyl cellulose (ethocel) due to its high stability towards heat, light, and chemicals. Zein is another potential alternative to ethocel as it has anti-oxidative and anti-microbial properties thus, increasing the efficacy of the resulting wound dressing. To enhance the elasticity and rigidness, low-molecular-weight polycaprolactone (LPCL) was added to ethocel while glycerol was added to zein. Semi-solid extrusion technique in 3D printing was used to decrease potential drug interaction and negate the need for organic solvent. The printed dressings were evaluated for its physicochemical properties, mechanical properties, and drug release capability. New peak found in zein blank and zein drug sample at 1047 cm^{-1} of FTIR analysis suggests potential chemical interaction of zein and glycerol. XRD and DSC analysis presented peaks that prove the dressings to be amorphous as it showed no peak and lacks peaks found in drugs, respectively. Mechanical testing showed Young modulus of 0.4948 MPa ± 0.0194 and 0.2135 MPa ± 0.0562 for ethocel and zein, respectively. Thus, ethocel was deemed to have lower elasticity yet higher fracture strength as compared to zein due to its high tensile strength. *In vitro* drug release suggests no evidence of polymer (ethocel and zein) effect towards the release of CUR and LEVO.

Keywords: *Curcumin, levofloxacin, ethyl cellulose, zein, Semi-solid extrusion 3D printed wound dressing*