**Results and discussion**

***Optimization of uncross-linked zein nanofibrous scaffolds***

Aqueous ethanol has been described as a solvent for zein electro-spinning, for its relative nontoxic nature. However, the high volatility of such a solvent promotes rapid evaporation of the mixed aqueous ethanol solution which produced ribbon-shaped nanofibers.[1](#_ENREF_1),[2](#_ENREF_2) DMF possesses a high boiling point at (~153 °C), high dielectric constant, high electric conductivity and low vapor pressure which can significantly enhance the electro-spinning process of zein. Thus, addition of DMF was reported to facilitate the transformation of particles electrospraying to electrospinning with a reduced nanofibers diameter.[3](#_ENREF_3) Nanofibrous zein meshes without bead defects were produced previously using DMF as a solvent, where the surface morphology clearly showed round-shaped fibers.[4](#_ENREF_4) In this regard, zein was dissolved in DMF solvent to prepare electrospun scaffolds with diameter lying in the nanometer range. Different concentrations of zein solution (15, 25 and 50 (w/w, %)) were electrospun using a wide range of flow rates (0.15-2.0 mL/h) and voltage values as a trail to obtain proper nanofibers formation (Table S1).

**Table S1** Properties of the zein stock solutions (mean ± SD, n =3)

|  |  |  |
| --- | --- | --- |
| **Zein Concentration****(w/v %)** | **Flow rate****(mL/h)** | **Spinning observation** |
| 15 | 0.15 | No fiber formed |
| 1.0 | No fiber formed |
| 2.0 | No fiber formed |
| 25 | 0.15 | Fibers formed with beads |
| 0.30 | No fiber formed |
| 1.0 | No fiber formed |
| 50 | 0.15 | Good fibers formed |
| 0.30 | Deformed fibers |
| 0.70 | Fibers formed with beads |

References

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