

of the electrospun mat, which is desired when a great number of sections from the whole mat may suffice for an application, for example, wound dressing scaffold.

While comparing the performance of the electrospun mat produced using a specific template design, for example the SS collector, it was observed that the dynamic mode of operation produced a mat with lower porosity and tensile strength than those of the mat produced in the static mode of operation. The drag force due to the interaction of air flow caused by the rotation of the collector and stream of polymer jets was expected to alter the deposition of the electrospun mat. The amount of air flow depends on the shape and size of holes on the collector at the onset of the collection of the electrospun mat. After sometime, the flow of air is reduced due to the partially deposited electrospun mat, which would determine the porosity of subsequent deposited electrospun fibres.

The mechanical properties of the electrospun mat produced using different collectors operated in the static mode were governed by the surface area of the collector, number of binding points, fibre diameter, pore size and thickness of the mat. Among all factors, the thickness and pore size of the electrospun mat are the most influential. In the case of the dynamic mode of operation of the collectors, additionally the drag force due to air flow along the rotating collector on the approaching stream of polymer jets would have also influenced the properties of the electrospun mat. Thus it was difficult to ascertain the reasons for the change in the trend of properties due to the dynamic mode of operation of collectors of seven different template designs with current experimental data and analysis.

Conclusions

The design of the template of the collectors influenced the properties of the electrospun mat produced. The dynamic mode of operation of most types of collectors yielded an electrospun mat with a low mean value of properties compared to that of the static mode. This study reveals that different collectors of the electrospinning process when operated in the dynamic mode lessened the inhomogeneity in properties among the different angular sections of the mat compared to the

mat produced by using the static mode of operation of the collectors. Based on the desired combination of properties such as Young's modulus, ultimate tensile strength, pore size and thickness, a collector and its mode of operations can be selected.



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