

Abstract

Mesenchymal stem cells secretome (MSC-S) are non-hematopoietic multipotent stromal cells that have the ability to renew themselves and differentiate into multilineages, which has been shown to have therapeutic effects on wound healing process. In order to produce a “ready-off-the-shelf” secretome powder, a lyophilization or also known as freeze-drying process needs to be carried out. In this study, UC-MSC was freeze-dried by using three freezing time variations: 24H, 12H and 6H, followed by evaluating the physicochemical properties of the cake. The results showed the 24H of freezing time produced the best quality of freeze-dried cake with a minimal ruptured surface due to the foamy appearance, as well as being able to maintain the particle size and zeta potential. Although an anomaly was observed in its thermal stability with a flattened DSC curve, 24H of freezing time could produce a good freeze-dried UC-MSC cake with minimal effect on its physicochemical properties compared to other groups. In contrast, the 6H of freezing time produced the most ruptured and porous foamy cake appearance, with an extensive shifting in the particle size distribution. No effect was found from variation of freezing time against the weight loss-on-drying, reconstitution time, pH and solution appearance.

Keywords: Freeze-dry; Mesenchymal stem cells; Secretome; Cake appearance; Freezing time.