The effect of natural hairy decellularized plant derived cellulose scaffolds on changing the fate of liver cancer cells

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Abstract

- Plant tissues have favorable characteristics that make them uniquely suited for use as scaffolds, such as high surface area, excellent water transport and retention, interconnected porosity, preexisting vascular networks, and a wide range of mechanical properties. And these tunable cellulose platforms can host a wide range of mammalian cell types from muscle to bone cells, as well as malignancies. In cancer and stem cell research, the natural cell characteristics and architectures are closely mimicked by the 3D cell models. Thus, the 3D cell cultures are promising and suitable systems for various proposes, ranging from disease modeling to drug target identification as well as potential therapeutic substances that may transform our lives. And In the present study, the aim is to use plant scaffolds like Tomato and nettle leaves that due to the special architecture of the scaffold and the shape of its pores, reduce or prevent the growth of cancer cells. Also, if possible, the drugs that will be obtained from the related articles will be screened at a lower dose than usual on the scaffolds and their effectiveness on the cells will be examined.

SEM analysis

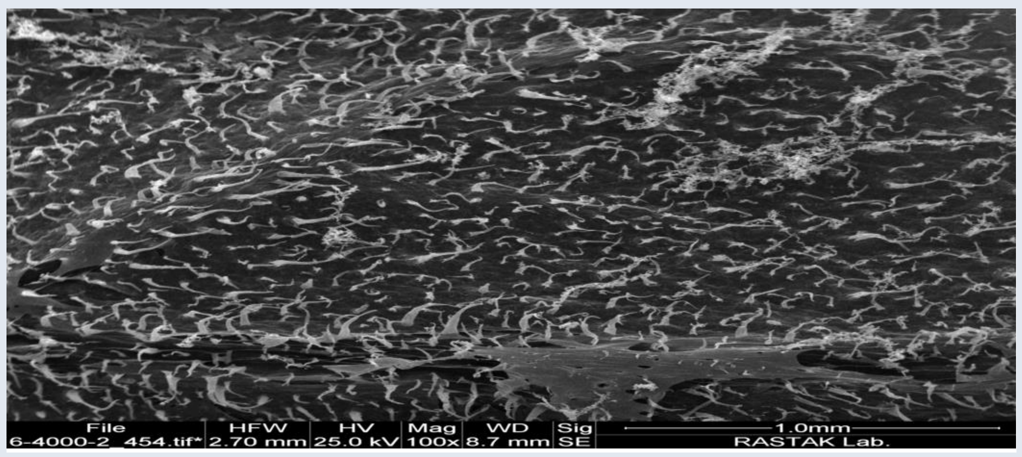

Figure 2 :SEM image from surface of Tomato leaf

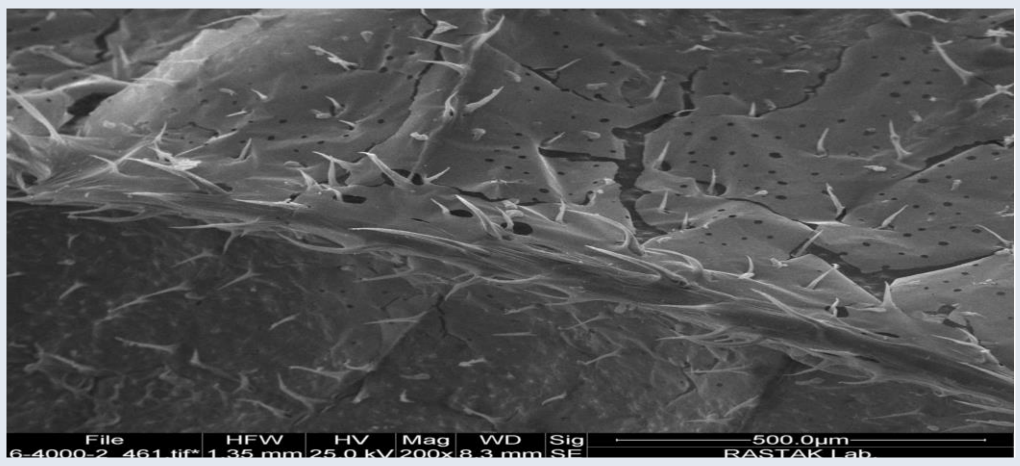

Figure 3 :SEM image from surface of Nettle leaf

Decellularization

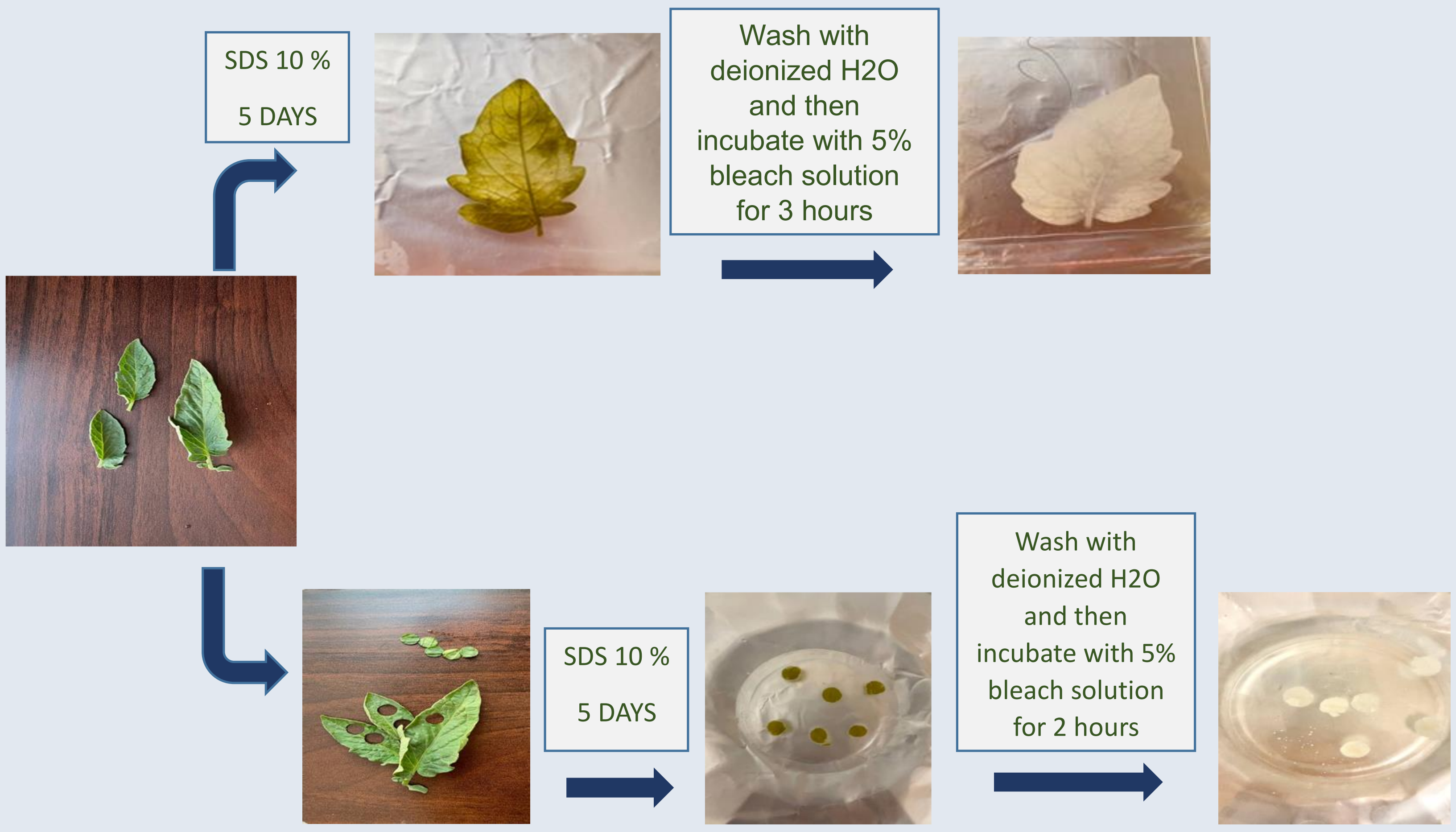

Figure 1: Decellularization process of Tomato leaves

Results

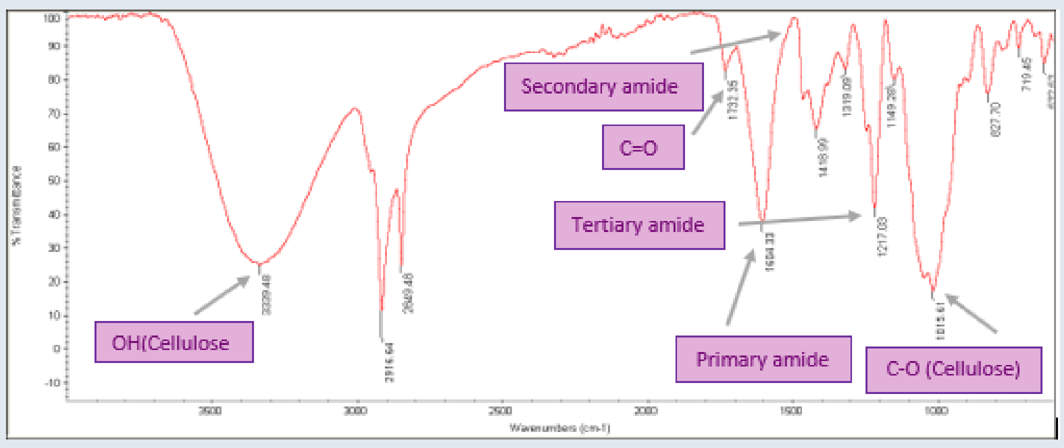

Figure 4 :(ATR-FTIR) result of the decellularized Tomato leaf scaffold

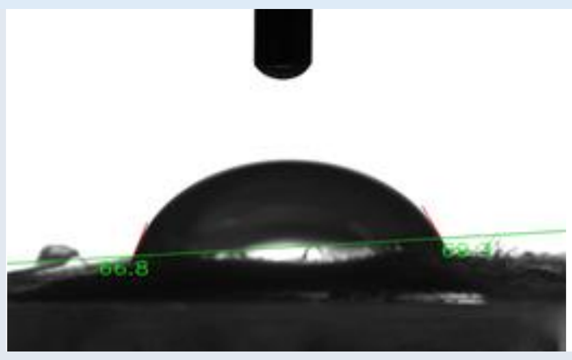

Figure5: Contact angel results of decellularized Tomato leaf scaffold

scaffold	$a_{s,BET}$	Total pore volume	Mean pore diameter
Tomato	8/2555	0/012998	6/2977

Table 1: The results of (BET) analysis of decellularized Tomato scaffold

Conclusion

The cellulose skeleton of plant tissue can serve as an attainable scaffold for mammalian cells after decellularization, which is advantageous when compared to synthetic polymers or animal-derived scaffolds. Attenuated total reflectance Fourier-transform infrared (ATR-FTIR) test was applied for identification of the surface chemical composition of the decellularized scaffolds.The contact angel of the decellularized Tomato was 66.8 , which indicates that the prepared scaffolds was located between hydrophilic and hydrophobic substrates. BET test results demonstrated that the tomato leaf scaffold has a significant specific surface area (8/2555 [$m^2 g^{-1}$]). And the ratio of the pore volume to the weight of the scaffold in the tomato leaf scaffold is also high (0/012998 [$cm^3 g^{-1}$]).

Reference

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