



# Residual SDS Reducing Methods in the Process of Decellularization of Muscle Tissue

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**Abstract.** Developing bioinks that are biocompatible and well-suited with the printing process is crucial for the progress of 3D bioprinting tissue engineering field. Decellularized extracellular matrix (dECM) bioink is considered a promising material for bioprinting applications due to its inherent composition. However, the laboratory protocols for obtaining this bioink involve the use of sodium dodecylsulphate (SDS) detergent which is widely known as an agent that causes lysis of the cell membrane. This study reports the fabrication of decellularized matrix gels and the comparison between the morphology and rheological behavior of the extracellular matrix gels treated with different SDS elimination methods. These dECM gels were treated with PBS, acetone or trichloroacetic acid (TCA). Scanning electron microscopy revealed that the PBS washes and the acetone treatment maintained the porous gel structure. The flow curve of the three gels was also studied and determined that the bioinks has a pseudoplastic behavior and that the viscosity of the TCA treated gel is relatively lower (0.08 Pa·s) than the acetone and PBS treated dECM, 0.2 Pa·s 0.3 Pa·s respectively. Even though the dECM gels treated with acetone and TCA encourages the cell survival, the storage modulus of acetone-treated bioink is above the loss modulus indicating that the microstructure is able to resist the shear stress and hold its conformation.

**Keywords:** Tissue engineering · Bioprinting · dECM bioink · Sodium dodecyl sulfate (SDS)

## 1 Introduction

One of the most emerging techniques in tissue engineering is bioprinting. The bioprinting process consists of the precise deposition of biomaterial and cells layer-by-layer in pre-defined computer-aided designs. The bioprinting methods are classified into three main groups, according to the operating mechanisms: extrusion-, droplet-, and laser-based process. The comparison of bioprinting techniques in terms of the operating principles, the components, as well as the advantages and disadvantages of each one is described elsewhere [1]. Although, recent advances in the printing of skin