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# A More Sustainable Decellularized Plant Scaffold for Lab Grown Meat with Ocean Water

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**Abstract :** The world's population is expected to reach over 10 billion by 2050, creating a significant demand for food production, particularly in the agricultural industry. Cellular agriculture presents a solution to this challenge by producing meat that resembles traditionally produced meat, but with significantly less land use. Decellularized plant scaffolds, such as spinach leaves, have been shown to be a suitable edible scaffold for growing animal muscle, enabling cultured cells to grow and organize into three-dimensional structures that mimic the texture and flavor of conventionally produced meat. However, the use of freshwater to remove the intact extracellular material from these plants remains a concern, particularly when considering scaling up the production process. In this study, two protocols were used, 1X SDS and Boom Sauce, to decellularize spinach leaves with both distilled water and ocean water. The decellularization process was confirmed by histology, which showed an absence of cell nuclei, DNA and protein quantification. Results showed that spinach decellularized with ocean water contained 9.9 ± 1.4 ng DNA/mg tissue, which is comparable to the 9.2 ± 1.1 ng DNA/mg tissue obtained with DI water. These findings suggest that decellularized spinach leaves using ocean water hold promise as an eco-friendly and cost-effective scaffold for laboratory-grown meat production, which could ultimately transform the meat industry by providing a sustainable alternative to traditional animal farming practices while reducing freshwater use.

**Keywords :** cellular agriculture, plant scaffold, decellularization, ocean water usage
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