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## **Design a novel biodegradable hydrogel scaffold for cultured meat production**

### **Abstract**

With the rising demand for sustainable protein sources, cultured meat has emerged as a promising alternative to conventional animal agriculture. One of the main challenges in this field is the development of edible, biocompatible scaffolds capable of supporting the formation of structured, meat-like tissues with desirable texture and composition. Hydrogels, particularly those derived from naturally occurring materials, offer a promising platform due to their tunable mechanical properties, high water content, biocompatibility, and overall suitability for food and tissue engineering applications.

This study investigates the potential of biodegradable, food-safe hydrogels as scaffolding materials for cultured meat. Initial efforts focus on identifying hydrogel systems that allow tunability in mechanical behavior and compatibility with 3D structuring techniques, such as extrusion. Emphasis is placed on selecting materials that align with clean-label requirements and are conducive to scalable processing conditions. Early findings support the feasibility of using selected hydrogels for structured tissue formation, contributing to the broader goal of engineering cost-effective, sustainable scaffolds for cellular agriculture.

This research aims to inform the design of next-generation biomaterials that address both the biological and industrial demands of cultured meat production. The outcomes of this work will help shape further material development in upcoming stages of the PhD study.

***Keywords – Cultured meat, biodegradable hydrogel, food safety, cost effective***