

POLYMERIC SCAFFOLDS FOR ARTIFICIAL MUSCLE TISSUE-CULTURED MEAT

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Raising animals for human consumption is a significant contributor to greenhouse gas emissions. In terms of greenhouse gas emissions, water consumption, and land use, cultured meat is likely to be more efficient than conventional meat [1]. The progress of edible scaffolds for cultivated meat in large scale-production is a major attraction. Electrospinning technology is recognised for it being an efficient, economical, and environmentally friendly technique to produce ultra-fine biopolymer fibres [2]. The work uses zein as a bio-polymer for electrospinning. Zein, a hydrophobic mixed protein derived from maize that is primarily composed of these proteins, is recommended for use as a mostly non-allergenic proteinaceous material in the food industry, according to a thorough analysis of alternatives [3]. The fibrous structure of electrospun fibres can mimic the natural ECM components due to the favourable properties of the main biomaterial mentioned above, making it easy to produce and suitable for expansion [4].

To make electrospinning solutions of 25 w/v from zein and other additives, including polyethylene oxide (PEO), sodium chloride (NaCl), glucose, and glycerol, the solutions were dissolved in an ethanol-water solvent mixture of varying ratios. The electrospinning process was carried out at 24.5 °C and approximately 38% relative humidity with an applied voltage of 14 kV. The effects of solution concentration and processing parameters on fibre production and morphology were thoroughly examined.

The initial results indicate promising outcomes under the solution concentration of 70:30 v/v ethanol-water mixture with the suitable parameters, including flow rate 6 (ml/h), distance from needle to collector 10 cm. This specific combination improves uniformity, reduced bead formation, minimized dripping of solvent while ejecting from the needle, demonstrating optimized spinnability and consistency. Thus, the existing studies are currently being thoroughly scrutinized and optimized, while their potential utilization will be examined for cell culture studies to be carried out later.

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