Production of raw materials with a microbial cell factory for cellular agriculture

PhD candidate	Jelle Hoek Email: j.c.hoek@tudelft.nl
Promotor	Prof. dr. Jean-Marc Daran
Co-promotor/Supervisor	Dr. Marieke Klijn Dr. Marcel Vieira-Lara
Institute	Delft University of Technology Department of Biotechnology Bioprocess Engineering section
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Project description

The world population is expected to grow to nearly 10 billion people by 2050, and with it an enormous demand for food products from livestock food systems [1]. Since food systems are responsible for a third of global greenhouse gas (GHG) emissions, alternatives in this market are urgently needed [2]. Cellular agriculture offers a solution with great potential by producing animal proteins using tissue and bioprocess engineering in controlled environments. Cultivated meat can circumvent ethical and environmental problems associated with current systems, as it does not require animal slaughter and significantly reduces land use, GHG emissions, and water consumption [3], [4]. While cultivated meat has the potential to serve as a sustainable alternative to livestock products, its high production cost, particularly due to the expensive growth medium, remains a major challenge [3].

This PhD project aims to produce a microbial extract to supplement or partially replace the costly ingredients in cultivated meat media. Several microorganisms and extraction methods will be selected to create an extract with the desirable amino acid and vitamin composition required for cultivated meat media. The robustness of the chosen extraction process will be validated by analytical methods such as mass spectrometry. The potential replacement of expensive medium ingredients such as growth factors and BSA will be explored as well, since growth factors can contribute up to 60-80% of the medium costs [5]. To find the best alternative, the extracts will be tested for their ability to support cell proliferation in both adherent (2D) and suspension (3D) mammalian cell cultures.

References

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