

Hub | **ScienceDirect** | Scopus | SciTopics | Applications[Register](#) | [Login](#) | [Go to SciVal Suite](#)
You have **Guest** access to ScienceDirect
[Find out more...](#)[Home](#) | [Browse](#) | [Search](#) | [My settings](#) | [My alerts](#) | [Shopping cart](#)[Help](#)All fields Author
Journal/Book title Volume Issue Page [Search ScienceDirect](#)[Advanced search](#)[Search tips](#)[Purchase](#)[Export citation](#)[Abstract](#) | [Article](#) | [Figures/Tables](#) | [References](#)**Innovative Food Science & Emerging Technologies**

Volume 11, Issue 1, January 2010, Pages 13-22

doi:10.1016/j.ifset.2009.10.007 | [How to Cite or Link Using DOI](#)[Cited By in Scopus \(1\)](#)[Permissions & Reprints](#)

Review

Possibilities for an in vitro meat production system

I. Datar, M. Betti

Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5



Received 28 June 2009; Accepted 11 October 2009. Editor Proof Received Date 26 October 2009. Available online 20 October 2009.

Abstract

Meat produced in vitro has been proposed as a humane, safe and environmentally beneficial alternative to slaughtered animal flesh as a source of nutritional muscle tissue. The basic methodology of an in vitro meat production system (IMPS) involves culturing muscle tissue in a liquid medium on a large scale. Each component of the system offers an array of options which are described taking into account recent advances in relevant research. A major advantage of an IMPS is that the conditions are controlled and manipulatable. Limitations discussed include meeting nutritional requirements and large scale operation. The direction of further research and prospects regarding the future of in vitro meat production will be speculated.

Industrial relevance

The development of an alternative meat production system is driven by the growing demand for meat and the shrinking resources available to produce it by current methods. Implementation of an in vitro meat production system (IMPS) to complement existing meat production practices creates the opportunity for meat products of different characteristics to be put onto the market. In vitro produced meat products resembling the processed and comminuted meat products of today will be sooner to develop than those resembling traditional cuts of meat. While widening the scope of the meat industry in practices and products, the IMPS will reduce the need for agricultural resources to produce meat.

Keywords: In vitro meat; Myocyte culturing; Meat substitutes

Article Outline

1. [Introduction](#)
2. [Basic methodology](#)
3. [Cells](#)
 - 3.1. [Native muscle tissue formation](#)
 - 3.2. [Possible cell types](#)

Related Articles

- Economic significance of wool in meat production system...
Agricultural Systems
- Attitudes of European citizens towards pig production s...
Livestock Science
- Calorific value and cholesterol content of normal and l...
Trends in Food Science & Technology
- Worldwide transformation of diets, burdens of meat prod...
Enzyme and Microbial Technology
- On resource use in food production systems: the value o...
Ecological Economics

[View more related articles](#)

Related reference work articles e.g. encyclopedias

- PRODUCTION SYSTEMS | Red Meat Animals
Encyclopedia of Meat Sciences
- ENVIRONMENTAL IMPACT OF MEAT PRODUCTION |
Primary Produ...
Encyclopedia of Meat Sciences
- RESIDUES IN MEAT AND MEAT PRODUCTS | Residues
Associate...
Encyclopedia of Meat Sciences
- PRODUCTION SYSTEMS | Other Species
Encyclopedia of Meat Sciences
- PRODUCTION SYSTEMS | Poultry
Encyclopedia of Meat Sciences

[More related reference work articles](#)

ELSEVIERJOBS MORE JOBS

Find your next job with
ELSEVIERJOBS
[CLICK HERE >](#)

**Scientist For Chemistry**
Lifestyle, PRAS, Shanghai, China

[MORE](#)

**Scientist For Physiology**
Lifestyle, PRAS, Shanghai, China

[MORE](#)

3.2.1. [Proposed cell types](#)

3.2.2. [Adult stem cells](#)

3.2.3. [Dedifferentiated cells](#)

3.3. [Replicative ability](#)

4. [Scaffold](#)

4.1. [Shape](#)

4.2. [Texture and microstructure](#)

4.3. [Composition](#)

4.4. [Scaffold removal](#)

5. [Culture conditions](#)

5.1. [Growth media](#)

5.2. [Regulatory factors](#)

5.3. [Contraction](#)

6. [Bioreactor](#)

6.1. [Medium perfusion](#)

6.2. [Oxygen carriers](#)

7. [Control and manipulation](#)

8. [Limitations to the methodology](#)

8.1. [Nutritional value](#)

8.2. [Metabolism](#)

8.3. [Large-scale operation](#)

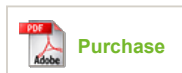
9. [Conclusion and future prospects](#)

[Acknowledgements](#)

[References](#)

[View Record in Scopus](#)

 Corresponding author. Tel.: +1 780 248 1598.



Copyright © 2009 Elsevier Ltd. All rights reserved.

Innovative Food Science & Emerging Technologies
Volume 11, Issue 1, January 2010, Pages 13-22