Protein2.0 (2019-2022)

The biosynthetic protein transition – assessing impacts, outcomes and opportunities for Norway's "post-animal bioeconomy"

Rob Burton

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PROTEIN2.0 The Future of Food?

NIBIO NTNU The James Hutton Institute Nofima

Ruralis Institutt for rural- og regionalforskning

Project proposal based on paper

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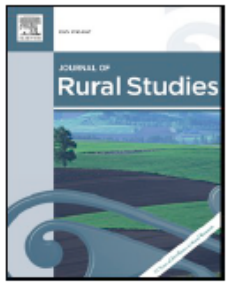

The potential impact of synthetic animal protein on livestock production: The new "war against agriculture"?

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The power of substitution (madder – alizerin dye)

Major agricultural industry across Europe

First synthesised 1868

1886 “Huge quantities of madder root are decomposing in the soil, and not thought worth the cost of collection”

Industry extinct 1891

The power of substitution (vanilla – vanillin)

Major global agricultural industry

First synthesised 1874

"The invention died a natural death and is heard of no more." (Bernays, 1883)

Production growth stopped 1890s

Why research this topic?

- Protein researchers (biomedical engineers – biochemists – cardiologists – microbiologists, etc.) from biomedical sector formed start-ups to develop food products from tissue engineering and precision-fermentation
- By the end of 2018 18 startups were working on the production of cultivated protein
- If similar to historical substitutions, impacts for Norway's agriculture and aquaculture could be profound

Project Aim

"To assist Norway to prepare for the arrival of synthetic animal proteins by assessing the likely impacts, outcomes and opportunities provided by the technology."

Researchers – current WP leaders

1. Forsker 1 - Rob Burton (Ruralis)
2. Prof. Christian Klöckner (NTNU)
3. Prof. Hugh Campbell (University of Otago – NZ)
4. Forsker 1 – Klaus Mittenzwei (Ruralis)
5. Senior Scientist - Gary Polhill (James Hutton – Scotland)
6. Senior Scientist – Mads Gjefsen (Samforsk)

\+ other talented staff

Project Objectives (1)

1. To assess 3 different forms of synthetic protein and processes of protein transition (WP2).
2. To gauge Norwegian consumer response to the introduction of synthetic protein technologies (WP3).
3. To explore how synthetic protein might disrupt the global food system (WP4).

Project Objectives (2)

4. To model the potential economic disruption of synthetic protein on the Norwegian economy/value chains (WP5).
5. To generate integrated change scenarios through social system modelling (WP6).
6. To engage with stakeholders to assess scenarios from WP6 and generate policies and strategies for response (WP7).

Project research outputs so far

1. Helliwell & Burton (2021): The promised land? Exploring the future visions and narrative silences of cellular agriculture in news and industry media. Journal of Rural Studies 84, 180–191
2. Polhill et al. (2021): Using Agent-Based Models for Prediction in Complex and Wicked Systems. JASSS, 24(3) 2.
3. Klöckner et al. (2022): Milk, Meat, and Fish from the petri dish - Which attributes would make cultured proteins (un)attractive and for whom? Results from a Nordic survey. Frontiers in Sustainable Food Systems. https://doi.org/10.3389/fsufs.2022.847931
4. Kemnitz et al. (2022): Technology crises in primary production – the transition from wool to artificial fibres in New Zealand. Centre for Sustainability Research Report No. 6. University of Otago, Dunedin.
5. Gustavsen & Mittenzwei (2022): Potential demand for synthetic meat. Proceedings in System Dynamics and Innovation in Food Networks. https://doi.org/10.18461/pfsd.2022.2004
6. Mittenzwei & Britz (Submitted): The potential impact of synthetic protein-based food products for Norwegian agriculture. Submitted to Environmental Innovation and Societal Transitions.

+ Four additional papers are nearing completion
+ More papers?