Biotechnology for Milk Production without Livestock Farming

Development status

Phase 2

Feasibility study. There is a realistic design of the technology and the initial tests in the laboratory are leading to the specification of the technology requirements and its capabilities.

IP protection status

know-how

Partnering strategy

Co-development, Collaboration, investment, spin-off

Institution

MUNI TTO Technology Transfer Office

Masaryk University

Challenge

Milk and dairy products are important food sources rich in nutrients, minerals, and vitamins. However, livestock farming for milk production is associated with negative environmental impacts, including the production of greenhouse gases, high water consumption, and demands on soil, and carries the stigma of cruelty to animals. Therefore, developing environmentally sustainable and ethically sound biotechnologies for milk production is important. Our biotechnology enables the production of nutritionally wholesome milk without the need for animal farming by employing the culture of animal cells (mammalian tissue cell cultures). This is unique biotechnology with great application potential in the food industry and human nutrition. Its concept falls within the United Nations' sustainable development goals, including the „Zero Hunger Challenge“ and regulation and reduction of methane emissions to combat the climate crisis.

Description

Current trends support the replacement of environmentally challenging and often inhumane practices of milk production. However, plant milk alternatives have a different taste, and their consistency does not enable the production of cheese and similar products by current technologies. Moreover, plant milk alternatives do not cover the nutritional need for essential amino acids. Approaches for animal protein production in yeasts enable the production of nutritionally adequate proteins but to make milk they require an additional combination of the proteins with fat, water, and minerals from other sources, and yet the product does not reach the quality of animal milk to produce cheese of flavor and structure identical to cheese from animal milk. Our biotechnology employs the same type of cells for milk production, which produce it in a living organism. Therefore, it is expected that the milk produced by our biotechnology will have the same characteristics and nutritional values as the milk from an animal but without the environmental and ethical issues associated with livestock farming. Another advantage of our biotechnology is the

elimination of the risk of bacterial and viral infections from farmed animals. Our biotechnology applies to milk production of different species, including cows, goats, and sheep.

Commercial opportunity

Biotechnology for milk production without livestock farming has a strong commercial potential in the next-generation food industry.