Good Food Institute

FACT SHEET
Last update: September 2025

Brewing protein security: new study highlights policy opportunities to scale affordable, reliable fermentation.

An analysis from the Good Food Institute shows protein made using fermentation is nearing cost-competiveness with conventional sources. Policy mechanisms, including manufacturing grants, open-access R&D, loans and loan guarantees, tax incentives, and public procurement can further drive down costs, enhance food system resilience, and scale U.S. biomanufacturing capabilities.

Scaling fermentation-derived protein production boosts domestic biomanufacturing and national security

Fermentation — the process of leveraging microbes to produce high-value products — has long been used in the pharmaceutical, fuel, and food industries to produce goods like insulin, ethanol, and yogurt. Today, the United States is leading a global race to expand fermentation-enabled manufacturing across industries, including food, chemicals, plastics, and materials — but competitors are rapidly closing the gap in this critical industry. Independent analysis projects a medium and high risk of China gaining a monopoly in biological manufacturing and synthetic biology, respectively. According to the National Security Commission on Emerging Biotechnology, the United States must rapidly scale biomanufacturing solutions to compete with China.

Fermentation-derived protein production is **flexible, efficient,** and can help the U.S. **achieve the needed scale** for biomanufacturing capacity.

- Equipment used for biomanufacturing food is applicable to other types of industrial goods. The same production facility can produce food, fuels, and fibers and ramp up and switch production based on demand.
- Producing proteins via fermentation has the potential to diversify our food system, leading to improved supply chain resiliency and new economic opportunities.
- Fermentation companies can leverage agricultural sidestreams as feedstocks, and create new market opportunities for U.S. farmers.
- Fermentation can produce proteins with low-resource inputs, including gaseous feedstocks, efficiently providing nutritious foods in diverse settings, including conflict or disaster zones.

GFI's June 2025 fermentation techno-economic model meta-analysis shows that producing proteins via biomass fermentation is nearing cost-competitiveness with incumbent protein sources, including conventional beef and pork. The analysis also identifies multiple opportunities to reduce additional costs. Advancements across feedstock processing, raw materials, and innovative financing for capital expenditures will further lower costs, leading to affordable, high-quality protein biomanufacturing that bolsters domestic production, defense, and national security objectives.

Policy makers can drive down costs and scale up fermentation-derived protein biomanufacturing

The following policy mechanisms support biomanufacturing:

- **Loan and loan guarantee programs** that offer low interest rates and long repayment timeframes like DoD's Office of Strategic Capital debt financing solutions.
- **Grants, voucher programs, and tax incentives** to support manufacturing activities. Such programs may support engineering plans, site selection, techno-economic assessments, life cycle assessments, equipment purchase and installation, and construction.
- **Investments in public-private fermentation hubs** with shared pilot plants and scale-up facilities to reduce capital expenditure burden on individual companies. These Contract Development and Manufacturing Organizations (CDMOs) can enable efficient commercial scale up and support regional economies.
- **Incorporation of fermentation-derived proteins into public procurement channels**, including for the military and humanitarian assistance.
- **Open-access research** into the development and optimization of food-safe high-performing microbial strains, feedstock processing, downstream processing recovery yield, and specialized equipment such as advanced bioreactors and efficient gas handling systems.

Fermentation-derived protein production for national security

The U.S. Department of Defense recognizes the potential for fermentation technology to solve supply logistics challenges in conflict and crisis settings, secure domestic food supply chains, and reduce reliance on agricultural imports.

- Modular fermentation systems to produce food at the point-of-need, for example, on the back of a military vehicle.
- On-demand production of food via gas fermentation starting from air, water, and electricity with minimal or no additional inputs.
- Building out the defense bio-industrial base through grants to cutting-edge fermentation biomanufacturing industry players, including food biomanufacturing.

Fermentation-derived food production provides a crucial opportunity to secure domestic supply chains and advance national security. Read the full techno-economic model analysis here.