Petition to the European Parliament

Fast-Tracking Safe, Clean Next-Generation Food Technologies for Europe's Competitiveness, Strategic Autonomy and Soft Power

Building the Food Infrastructure of the Future

To the European Parliament – Committee on Petitions (PETI), with a request that the European Commission (DG SANTE, DG AGRI, DG RTD, DG GROW and EFSA) provide a formal response.

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1. Purpose of the Petition

Food systems are a core component of Europe's strategic industrial infrastructure — yet EU industrial policy has not consistently treated them as such. This petition calls on the European Union to recognise a category of technologies enabling more direct nutrient production pathways — hereafter referred to as **"shortcut nutrient technologies"** — including precision fermentation, algae-based production and related systems — as strategic food-system infrastructure, and to establish coordinated, safe and timely pathways for their deployment.

These technologies operate upstream, shaping nutrient inputs rather than end-consumer foods. They leave Europe's diverse food cultures, cuisines and culinary traditions intact and, by relieving structural pressure on land and input markets, create better conditions for high-quality, regionally embedded food production. By diversifying nutrient inputs, farmers can allocate more land, labour and capital to food grown directly for people, rather than remaining structurally locked into resource-intensive feed and commodity cycles.

Shortcut nutrient production builds on industrial platforms already widely used in pharmaceuticals, enzymes, vitamins and food processing, supported by long-established safety frameworks and regulatory oversight.

This is a formative moment. The rules governing this emerging sector are not yet fixed. Europe still has the opportunity to shape standards, industrial models and value chains, rather than adapting later to dependencies defined elsewhere. Delayed action risks locking the EU into long-term technological and supply-chain dependence while other regions capture industrial leadership, intellectual property and market power in these future-facing sectors.

Re-engineering nutrient inputs can deliver large system-level sustainability gains without requiring changes in individual consumer behaviour by transforming the infrastructure behind food and feed. This approach complements, rather than replaces, efforts to improve agricultural practices, reduces systemic pressure on land, inputs and ecosystems, and strengthens resilience by diversifying production pathways across technologies and regions.

Finally, the development of clean nutrient industries offers tangible opportunities for rural and regional development, creating skilled jobs beyond traditional agriculture and strengthening regional value chains.

1.1. Definition: Shortcut Nutrient Technologies

For the purpose of this petition, "shortcut nutrient technologies" refers to production systems that shorten or bypass extended biological nutrient detours and enable more direct generation of proteins, lipids and functional ingredients.

These include, but are not limited to, precision fermentation, algae-based production, microbial proteins, advanced plant-protein processing, circular nutrient recovery systems and other technologies that improve nutrient-conversion efficiency.

Much of today's food infrastructure relies on extended biological nutrient detours, in which nutrients pass through multiple intermediate stages before reaching final food products.

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2. From Detours to Shortcuts: The Strategic Opportunity

The European Union currently finances, regulates and normalises a food system built on extended biological and geographical detours, while technologies enabling more direct nutrient cycles remain slowed by institutional and regulatory lag in adapting to emerging production paths, fragmented approval channels and a lack of strategic prioritisation.

Precision fermentation, algae-based production and related technologies enable the EU to:

- sustainably produce EPA/DHA for feed/food, avoiding wild fish extraction;
- supply functional ingredients for food and feed without reliance on fragile marine ecosystems or distant supply chains;
- reduce pressure on fisheries while maintaining nutritional outcomes;
- keep value creation, manufacturing, and IP within the EU.

These are not speculative technologies. They are already scaling globally and becoming a competitive domain for the United States and parts of Asia. The strategic question is therefore not whether they will be used, but whether Europe will lead in shaping and hosting these industries — or import technologies, standards and inputs developed elsewhere.

2.1. Illustrative Example A: Omega-3 nutrient detours

Omega-3 fatty acids (EPA and DHA) originate in marine microalgae. Fish do not synthesise omega-3 themselves; they accumulate it by consuming algae or organisms that feed on algae. Despite this, the dominant EU supply pathway for omega-3 operates through a long biological and geographical detour, in which omega-3 is extracted from wild pelagic fish and routed through feed and aquaculture systems before reaching the table:

> *marine primary production (microalgae) → wild pelagic fish → fishmeal/fish oil/omega-3 → farmed fish and livestock → EU consumers*

This routing multiplies extraction pressure and conversion losses, disconnects EU consumption from the ecological origins of key nutrients, and ties European food systems to distant extraction sites, where communities far from consumers bear ecological and social costs.

A more direct pathway exists when omega-3 is delivered via wild fish consumed directly:

> *marine primary production (microalgae) → wild fish → EU consumers*

However, the shortest and most direct route — which avoids intermediate biological detours altogether — remains underutilised:

> *microalgae (primary production) → omega-3 oils → humans and feed*

Shorter nutrient detours reduce ecological pressure, help meet climate and biodiversity objectives, lower systemic risk, and anchor strategic nutrient production within the European Union.

2.2. Illustrative Example B: Palm Oil and Tropical Fat Supply Chains

A parallel case can be observed in the EU's long-standing dependence on palm oil and other tropical vegetable oils as primary lipid inputs across food, feed, cosmetics and biofuels.

Despite decades of sustainability initiatives, certification schemes and due-diligence frameworks, EU demand for cheap tropical oils continues to embed deforestation risk, biodiversity loss and land-use pressures in distant ecosystems. These challenges are treated primarily as governance and certification problems, rather than as symptoms of a deeper structural dependency on elongated nutrient supply routes.

Emerging technologies for producing lipids through microbial fermentation and algae-based systems illustrate that alternative, land-sparing lipid production pathways are technically feasible. However, as with omega-3, regulatory frameworks not yet adapted to emerging production pathways, fragmented approval channels and a lack of strategic industrial support delay their scaling. This perpetuates reliance on extractive tropical supply chains instead of enabling the gradual diversification of lipid sources within more resilient, low-impact European production.

This parallel underlines that fast-tracking safe, scalable nutrient production technologies is not a niche intervention, but a cross-cutting requirement for reducing the EU's ecological footprint and external dependencies across multiple nutrient classes (lipids, proteins and functional inputs).

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3. Impact on Europe's competitiveness, jobs, and autonomy

Building domestic capacity in strategic nutrient inputs and clean food industries offers:

- reindustrialisation in clean sectors: biofactories, fermentation facilities, algae production plants and downstream processing;
- quality jobs in biotechnology, engineering, food tech, process design and applied research.
- strategic autonomy: reduced dependence on imported inputs for feed and human food.
- supply chain resilience: shorter, controllable production loops within the EU;
- global leadership and soft power: exporting technologies, standards and industrial models;
- long-term economic efficiency: shifting from reactive compensation for industrial decline to proactive investment in future industries.

Absent prioritisation, the EU risks repeating patterns seen in other strategic domains — importing technologies developed elsewhere while European firms struggle in capital-intensive, regulation-heavy markets.

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4. Benefits for EU Farmers: New Roles in a Rewired Food System

This transition is not about replacing primary producers or displacing "real food" with industrial substitutes. On the contrary, by reducing structural pressure on land, feed markets and volatile input chains, shortcut nutrient production can protect and strengthen the conditions for high-quality, regionally embedded food production for people. Existing agricultural systems and food traditions remain central; clean nutrient technologies provide additional capacity where current systems are structurally stretched.

Shortcut technologies help farmers by expanding their roles within higher-value, more resilient nutrient and bio-industrial value chains:

- diversification: supplying feedstocks for fermentation and algae production (sugars, biomass, agricultural side-streams), creating additional revenue streams;
- regional value chains: siting production and processing facilities in rural areas strengthens local ecosystems and keeps value creation closer to farms;
- stability: reducing exposure to volatile global feed, fishmeal and fertiliser markets lowers systemic risk for farm businesses;

- just transition: enabling farmers to participate in circular, regionalised nutrient cycles rather than being locked into extractive commodity chains.

The current model structurally locks many farmers into fragile input markets characterised by price volatility, high dependence on imported feed and fertilisers, and limited value capture. Shortcut nutrient infrastructures re-embed parts of the value chain locally, while relieving pressure on agricultural land and inputs — creating space for farmers to focus more on diverse, high-quality food production for regional and European markets.

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5. Fast-Tracking Is a Strategic Choice, not a Deregulatory Risk

This petition does not call for lowering safety standards or weakening scientific evaluation. Safety assessment, scientific scrutiny and regulatory oversight remain preconditions for deployment; fast-tracking concerns the coordination and sequencing of processes, not their dilution.

Current EU pathways for novel and fermentation-derived ingredients are slow, fragmented and poorly aligned with the urgency of ecological, geopolitical and supply-chain risks.

By contrast, in areas such as energy security and other strategic technologies, the EU has developed coordinated fast-track frameworks in response to geopolitical shocks and structural vulnerabilities. Food-system innovations that can reduce dependency on overfishing, fragile imports and elongated nutrient supply chains remain constrained by:

- lengthy and duplicative approval procedures,
- unclear categorisation across food, feed and functional ingredient frameworks,
- and a lack of strategic prioritisation and coordination across Directorates-General.

In this context, fast-tracking refers to the coordinated deployment and scaling of technologies already under development, not to abrupt system-wide replacement or regulatory shortcuts. It means establishing clear, predictable and risk-proportionate regulatory pathways, coordinated across DG SANTE, DG AGRI, EFSA, DG RTD and DG GROW, to prevent institutional deadlock while fully preserving safety standards, scientific integrity and public trust.

Fast-tracking is therefore a matter of governance and prioritisation, not deregulation.

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6. What is the Cost

Although some of these technologies currently involve higher costs, this is characteristic of early-stage strategic industries. These costs should be viewed in the broader context of:

- substantial unaccounted external costs of current supply chains (environmental degradation, depletion of natural resources, geopolitical exposure),
- the long-term economic value of domestic industrial capacity,
- and the role of policy in accelerating learning curves, scaling production and driving cost reductions through innovation and deployment.

Every major industrial sector Europe now considers strategic — from batteries to renewables — was once “too expensive” until policy, scale and learning curves made it competitive. Strategic investment today is precisely what makes these industries competitive tomorrow.

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7. Contribution to EU Climate, Resource and Circular Economy Goals

This proposal is consistent with and contributes to the objectives of the European Green Deal, the Farm to Fork Strategy and the EU's broader agenda on strategic autonomy, resource efficiency and resilient supply chains.

The European Union has committed to ambitious climate and resource-efficiency targets under the European Green Deal, including substantial reductions in greenhouse gas emissions, resource use and systemic waste across the economy.

Food and feed production play a significant role in these challenges. Long and resource-intensive nutrient pathways — in which proteins, lipids and functional ingredients are routed through extended biological and geographical chains before reaching consumers — contribute to avoidable losses of energy, nutrients and land productivity.

Technologies that enable more direct nutrient production pathways can reduce these systemic inefficiencies by shortening nutrient routes and lowering conversion losses across the food system. In doing so, they can contribute to broader EU objectives such as:

- reducing greenhouse gas emissions associated with land-use change, feed production and long supply chains;
- improving resource efficiency in the use of land, nitrogen, energy and marine resources;
- supporting circular and low-impact production models aligned with the European Green Deal.

By enabling more efficient nutrient production infrastructure, shortcut technologies can complement existing agricultural and sustainability policies while helping the European Union move closer to its climate, circular economy and resilience objectives.

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8. The Scale of the Opportunity

Rewiring the inputs of the food system represents one of the largest untapped industrial opportunities for the European Union. Today, vast volumes of protein, fats and functional ingredients are routed through long, resource-intensive biological and geographical chains before reaching European food and feed markets. These inputs underpin not only diets, but also the food processing, aquaculture, livestock, pharmaceutical and nutrition sectors.

By investing in direct nutrient production pathways — including algae-based omega-3, microbial and fermentation-derived proteins and fats, and other biotechnological inputs — the EU can:

- reduce dependency on fragile global commodity chains (marine resources, imported feedstocks, deforestation-linked oils),
- lower the environmental footprint of food and feed inputs at system level, making climate and nature restoration targets significantly more achievable without imposing behavioural change on individual consumers,
- anchor high-value manufacturing, IP and processing capacity within Europe,
- and position European firms as global suppliers of clean nutrient inputs for food, feed and functional ingredient markets.

These technologies build on production templates widely used in pharmaceuticals, enzymes, vitamins and food processing. They are not speculative or untested, but extensions of industrial platforms with long safety track records. The strategic question is therefore not whether such production pathways will expand globally, but whether Europe will shape and host this new industrial wave — or import the technologies, standards and inputs developed elsewhere.

Developing domestic capacity in clean nutrient inputs would allow the EU to move from managing the consequences of ecological pressure and import dependence to actively designing the next generation of food-system infrastructure — turning sustainability objectives into a driver of industrial renewal and global leadership.

9. Requests to the European Parliament and European Commission

This petition is intended as a step toward developing a coherent European policy framework for shortcut nutrient technologies and other efficiency-enhancing food system infrastructures.

The focus is on safely scaling food tech as EU infrastructure, not niche innovation. The petitioner respectfully calls on the European Parliament to request that the European Commission:

1. Recognise a category of "shortcut nutrient technologies" and classify it as resilience and strategic-autonomy infrastructure, aligning this domain with EU agendas on security of supply, critical technologies and industrial competitiveness.
2. Establish a strategic fast-track framework for nutrient-efficient and detour-reducing technologies, including precision fermentation, algae-based production and related systems, with coordinated guidance across DG SANTE, DG AGRI, EFSA, DG RTD and DG GROW.
3. Provide targeted funding instruments and regulatory clarity for EU-based companies building production capacity, including pilot, demonstration and scale-up facilities, as well as regional manufacturing hubs.
4. Integrate farmers into emerging value chains through CAP-linked innovation programmes and regional development funds, including support for feedstock supply, siting of facilities in rural areas, and circular use of agricultural side-streams.
5. Ensure that support mechanisms are accessible to SMEs, cooperatives and regional initiatives, not only to large industrial actors, in order to foster a diverse and resilient innovation ecosystem.

10. Conclusion

Europe is increasingly managing the consequences of elongated food-system detours: pressure on marine resources, dependence on global feed and nutrient inputs, and rising geopolitical vulnerability. Shortcut technologies offer a pathway to more resilient, regionally anchored nutrient infrastructure that strengthens EU autonomy while creating new industrial value.

Fast-tracking these technologies is therefore a resilience strategy: every tonne shifted to more direct nutrient pathways reduces ecological pressure, import dependency and systemic risk for the European Union.

The question facing EU institutions is not whether these technologies are "alternative", but whether Europe remains locked into legacy detours — or actively builds the next generation of food-system infrastructure.

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