Artisanal fermentation as a regulatory grey area in EU food law

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Artisanal fermentation is becoming increasingly popular among consumers. Yet, EU food law remains poorly attuned to its scale, methods, and values. Based on empirical insights from interviews with small-scale fermenters from eight European countries, this research note examines how producers respond to regulatory uncertainty and navigate blurred boundaries between production, education, and experimentation in the absence of clear guidelines. Building on these accounts, I advocate for a regulatory approach that recognises microbial diversity and is sensitive to the cultural significance of traditional practices.

Fermented foods are enjoying a renaissance across Europe. Long associated either with traditional preservation methods or with uniform industrial products, fermented foods are now at the heart of a growing movement that celebrates microbial diversity, craftsmanship, and sensory complexity. From sourdough bread and natural wine to kimchi and kombucha, fermentation has become a site of culinary creativity, health-conscious consumption, and increasingly, entrepreneurial experimentation.[2]

Small-scale producers are building businesses around fermentation practices that diverge from standardised industrial methods. These actors often work with wild or mixed cultures, use manual techniques, and produce fermented foods in small batches. Their operations frequently serve as sites of production as well as spaces for education, where fermentation is shared with curious consumers through workshops, pop-ups, and community events. However, this artisanal turn also presents regulatory challenges. While artisanal fermenters[3] draw on traditional knowledge and low-intervention methods, their products enter a regulatory landscape largely designed for scale, standardisation, and predictability.

1. Microbial cultures and the limits of legal recognition

The European General Food Law places responsibility for food safety squarely on food business operators, regardless of scale.[4] This foundational principle is further operationalised in Regulation (EC) No. 852/2004 on the hygiene of foodstuffs, which requires all food businesses to implement hygiene practices and procedures based on Hazard Analysis and Critical Control Points (HACCP).[5] While this framework is designed to ensure flexibility and accommodate traditional methods, in practice, it often assumes standardised processes and clearly defined risks. As a result, the tools and assumptions built into this framework are often ill-suited to the informal, heterogeneous, and microbially complex practices of artisanal fermentation.[6]

The legal status of microbial cultures is one example of this mismatch. In the EU, microbial cultures are treated as ingredients with a long history of use, yet they remain loosely defined in legislation.[7] There is no dedicated category or regulatory pathway for fermentation cultures, and they are not subject to premarket authorisation unless considered novel foods under Regulation (EU) 2015/2283.[8]

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2. Among others, FoodNavigator Europe reports on this trend in their article 'Fermented foods and beverages find favour with consumers'. Available at: https://www.foodnavigator.com/Article/2024/07/16/Fermented-food-trend-rising/
3. In this article, *artisanal fermentation* refers to small-scale food production practices that typically rely on manual techniques, traditional knowledge, and spontaneous or mixed microbial cultures, rather than industrialised starter strains or automated systems. For a detailed overview, see Vittorio Capozzi, Mariagiovanna Fragasso and Pasquale Russo, 'Microbiological Safety and the Management of Microbial Resources in Artisanal Foods and Beverages: The Need for a Transdisciplinary Assessment to Conciliate Actual Trends and Risks Avoidance' (2020) 8 Microorganisms 306.
4. Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety.
5. Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs.
6. Svend Laulund and others, 'Regulatory and Safety Requirements for Food Cultures' (2017) 5 Microorganisms 28.
7. ibid.
8. Regulation (EU) 2015/2283 of the European Parliament and of the Council of 25 November 2015 on novel foods, amending Regulation (EU) No 1169/2011 of the European Parliament and of the Council and repealing Regulation (EC) No 258/97 of the European Parliament and of the Council and Commission Regulation (EC) No 1852/2001.

To support microbial risk assessment, the European Food Safety Authority (EFSA) maintains the Qualified Presumption of Safety (QPS) list which enables streamlined evaluation of microorganisms deemed safe based on taxonomic clarity, history of use, and absence of potential hazards.[9] While the QPS list is helpful in principle, it reflects a limited view of fermentation.[10] Many artisanal fermenters rely on microbial consortia that emerge spontaneously or are inherited from other batches – practices that resist alignment with pre-defined microbial cultures or strains. As a result, these producers often operate outside the comfort zone of regulatory science, even when their methods are informed by deep experience and long-standing cultural traditions.

The growing interest in artisanal fermentation has not gone unnoticed by scholars of microbiology, food systems science, and food regulation. In 2016, Arielle Johnson, Science Director at the famed Danish restaurant Noma had described this movement as 'artisanal food microbiology': a culinary and scientific shift in which cooks, producers, and scientists collaborate to transform ingredients and generate novel flavours using microbes.[11] Capozzi et al. (2020) similarly note that fermentation processes are increasingly seen as sites of innovation, but caution that the celebration of spontaneity and tradition must be tempered by attention to food safety.[12] They advocate a 'third way' between industrial control and uncontrolled fermentation: a model that embraces microbial diversity while implementing appropriate hygiene and monitoring practices.[13] Specifically, this approach involves designing tailor-made multi-strain starter cultures derived from the natural microbial diversity found in traditional fermentations, thus preserving unique artisanal qualities while enhancing safety. It also includes the application of advanced analytical methods for continuous monitoring of microbial contaminants and adapting safety assessment frameworks, originally developed for single strains, to entire microbial consortia used in artisanal contexts. Despite its promise, widespread adoption of this 'third way' has been limited by gaps in microbiological education among producers and a lack of coordinated transdisciplinary governance. Regulatory bodies around the world have also been slow to adapt.[14] In the absence of tailored regulations, national authorities must interpret general food safety rules case by case, often relying on risk-based assessments that prioritise traceability and process control.

The rise of artisanal fermentation serves as an interesting case for examining how food law interacts with emerging, or in this case, re-emerging food practices. Underscoring how regulatory systems can struggle to accommodate actors who do not fit neatly into pre-defined categories, the case also inspires reflection on the role of legal ambiguity – not merely as a barrier, but as a condition that shapes how small producers imagine and enact compliance and manage risk. This research note contributes to that conversation by drawing on qualitative insights from interviews conducted with artisanal fermenters across Europe. The next section presents selected findings from these interviews, highlighting the tensions, workarounds, and strategies that arise when artisanal fermenters interact with food safety law.

2. Notes from an empirical study

Between June and December 2024, together with a colleague, I conducted 13 in-depth semi-structured interviews with fermentation entrepreneurs based in Denmark, Estonia, the UK, the Netherlands, Germany, and Hungary, France, and Italy. The inclusion criteria for the sample were: 1) should be a fermentation educator with more than two years of experience 2) should conduct in-person fermentation workshops 3) should be practising in a European city. We used a purposive sampling strategy, selecting participants who were actively engaged in small-scale or artisanal fermentation activities and who were known for their innovative approaches in their respective cities. Ultimately, the sample included small-batch producers, fermentation educators, hospitality consultants, and culinary researchers. Three out of 13 participants had an educational background in the natural sciences, five in social sciences and humanities, and five in hospitality or gastronomy. Interviews were recorded and analysed after obtaining written informed consent from the participants. After transcription, data were analysed thematically using an inductive coding approach in ATLAS.ti to capture emerging patterns and meanings across interviews. Codes were iteratively refined and grouped into thematic categories. Parts of the interviews explored how these fermenters experienced food safety law in practice, what strategies they developed in response to it, and how they envisioned their place within their local regulatory landscapes. These insights have been presented below.

2.1. Regulatory ambiguity and uneven enforcement

The interviewed fermenters shared that they operated in a regulatory landscape that often felt patchy and ill-defined. Producers in the Netherlands, Estonia, and Hungary, for example, described their interaction with food safety authorities as practically

9. See 'Qualified presumption of safety (QPS)'. Available at: https://www.efsa.europa.eu/en/topics/topic/qualified-presumption-safety-qps
10. Vittorio Capozzi, Mariagiovanna Fragasso and Pasquale Russo, 'Microbiological Safety and the Management of Microbial Resources in Artisanal Foods and Beverages: The Need for a Transdisciplinary Assessment to Conciliate Actual Trends and Risks Avoidance' (2020) 8 Microorganisms 306.
11. Arielle J Johnson, 'Artisanal Food Microbiology' (2016) 1 Nature Microbiology 16039.
12. Capozzi, Fragasso and Russo (n 9).
13. ibid.
14. ibid.

non-existent. The lack of enforcement offered space for experimentation and growth, but it also introduced uncertainty. Many knew they were operating without clear oversight, and some suspected that their business models would struggle to survive in more tightly regulated contexts.

Elsewhere, particularly in the UK, enforcement was more visible but not necessarily more coherent. Participants shared stories of inconsistent inspections and uneven interpretation of food safety requirements. While some Environmental Health Officers were described as open-minded, others were known to apply food safety standards in ways that failed to reflect the realities of microbial processes. Confusion around live cultures, spontaneous fermentation, or ingredients like koji and mycelium created friction between practitioners and regulators. In response, fermenters began filling the knowledge gaps themselves. Rather than avoiding or finding ways around regulation, some developed resources specifically aimed at informing and equipping inspectors. These were less acts of resistance and more efforts to cultivate understanding, reduce uncertainty, and make enforcement less arbitrary.

2.2. Anticipating changes in regulation

Even in the absence of formal oversight, fermenters did not operate carelessly. Some had proactively introduced safety protocols such as pH and temperature monitoring, even when the scale of their operations did not legally require it. Hygiene routines were formalised, batch logs maintained, and risk awareness embedded in daily practice. These efforts were mentioned mostly by fermenters with an academic background in microbiology or other natural sciences. Some others who lacked scientific knowledge with regard to health and safety often consulted those in their networks who could advise them about such matters.

Several participants also expressed awareness that the 'hobby fermentation' market was growing rapidly and expected that this would likely result in increased attention from competent authorities in the near future. Some worried that future regulations would be shaped by large-scale producers or food safety paradigms poorly suited to artisanal methods. In this context, informal precautionary measures and building good relations with inspectors became a form of strategic foresight and a way to prepare for a changing legal environment while maintaining a sense of agency.

2.3. Teaching and training as a safe zone

Education offered a space where fermenters could share knowledge, experiment openly, and build community, all while sidestepping the demands of formal food production. Workshops and public demonstrations allowed them to showcase techniques and sell their products without falling within the frameworks associated with commercial sale. The educational setting created a grey zone – one in which the fermenter was no longer a producer in the legal sense, but a guide or facilitator.

This positioning also came with a strong sense of duty. All eight participants involved in hospitality training, in particular, spoke of the need to emphasise safety and process control. Their aim was not only to introduce chefs to fermentation, but to embed safe practices into the everyday workings of professional kitchens.

Additionally, for fermenters invested in sustainability and societal wellbeing, their inability to donate surplus products was a recurring source of frustration. Events or workshops often produced more food than could be consumed on-site, but efforts to share this surplus with food banks or community organisations were often blocked. Unpasteurised products lacking formal labels or refrigeration that did not meet the criteria for sale via regular retail channels also did not meet the criteria for donation. As a result, food that could have supported food security goals was left unused and often wasted.

2.4. Fermentation in restaurants

Restaurants emerged as a space where fermentation often happens in secrecy. Five out of the eight fermenters who worked with or trained chefs and sommeliers had a background in hospitality themselves and described how jars of miso, wild ferments, or kombucha were tucked into cupboards, stored in staff rooms, or kept in spaces rarely visited by inspectors. These practices were not necessarily unsafe, but they were difficult to monitor, and even harder to regulate. As per the interviewees, they were a result of inspectors being insufficiently informed about evaluating the safety of artisanal and specialised fermentation processes.

Without formal guidance or industry norms, responsibility for safety fell on individual chefs and managers. Some took this seriously, especially when they had access to training or peer support. Others simply experimented, using intuition, books, online resources, and trial-and-error to guide their decisions.

3. Should small-scale, artisanal fermentation be regulated differently?

Across Europe, small-scale fermenters are playing an increasingly prominent role in public education about food. Every year, they introduce thousands of consumers to fermented foods, often drawing on traditional knowledge passed down through families, cultures, or communities. Additionally, they support hands-on learning that inspires others to experiment and explore artisanal fermentation as a business venture.

European food law already recognises certain categories of artisanal fermented food as culturally and economically significant. This recognition is most

clearly expressed through the system of Geographical Indications (GIs), governed by Regulation (EU) No 1151/2012 on quality schemes for agricultural products and foodstuffs.[15] Within this framework, products awarded Protected Designation of Origin (PDO) or Protected Geographical Indication (PGI) status often include specific fermentation processes or authorised microbial cultures in their legally protected specifications. In such cases, fermentation is not only regulated but legally codified as part of the product's identity, ensuring consistency while also preserving cultural and regional traditions.[16]

Examples such as Roquefort (PDO) or Choucroute d'Alsace (PGI) demonstrate how fermentation, when linked to geographic heritage, can benefit from legal protection. However, these cases are the exception. Fermented foods that fall outside the GI framework, including those that originate from non-European traditions or result from contemporary culinary innovation, are usually subject only to Regulation (EC) No 178/2002 and Regulation (EC) No. 852/2004. Neither regulation provides fermentation-specific provisions, and as a result, most artisanal and small-scale fermented foods continue to operate within a regulatory grey area, without harmonised definitions or microbial criteria at the EU or national levels.

The empirical insights shared in section 2 of this article highlight how fermenters are navigating this uncertainty in practice. Rather than rejecting or finding loopholes in regulation, many have adopted precautionary measures well beyond what is legally required at their scale. A significant number of fermenters also function as educators, running workshops and training sessions that extend microbial literacy and food safety know-how beyond the production site. Their work often touches on broader themes such as sustainability, food waste, seasonality, and the ethics of local sourcing. In effect, they are not only food producers but also facilitators of public engagement with food systems.

This dual role is especially relevant to regulatory discussions. Existing legal frameworks on food safety and hygiene tend to exclude educators, yet many fermenters operate as producers, trainers, and educators simultaneously. The growing popularity of fermentation-based entrepreneurship further complicates this picture. As more producers enter the sector and commercial interest increases, enforcement authorities may be prompted to intervene more actively. Without appropriate differentiation in the law, small-scale actors risk being regulated according to industrial standards that do not match their scale, methods, or aims.

This moment presents an opportunity not simply to apply existing regulatory tools, but to reconsider how artisanal fermentation can be best governed. Drawing on the experiences shared in this research, many fermenters desire clear but adaptable standards that allow them to document and validate their own precautionary practices (e.g., pH monitoring, batch logs) without being forced into rigid HACCP models designed for large-scale operations. This could include the development of new, scale-sensitive guidance documents, co-authored with fermenters and public health experts. Additionally, artisanal fermenters expect spaces for dialogue with inspectors and policymakers, enabling mutual learning and fostering trust. National authorities might also consider formal recognition of educational fermentation activities and community-based food initiatives, distinguishing them from full-scale commercial operations.

By embedding the principles of the 'third way' as described by Capozzi and colleagues[17] into legal frameworks, future regulations could better reflect what many artisanal fermenters are already trying to achieve in practice: using context-specific microbial cultures, documenting processes through batch logs and pH checks, and relying on informal peer networks to share safety knowledge. Instead of imposing rigid, industrial-style controls, such an approach would recognise and formalise these existing precautionary efforts while allowing flexibility in demonstrating safety. However, implementing such a model requires substantial investment in education, accessible analytical tools, and trust-building between producers and regulators. Without this kind of support, even a more flexible framework risks reproducing exclusions or overwhelming small producers.

The GI framework, though limited in scope, offers a useful reference point. Its emphasis on linking microbial practices to place, identity, and tradition provides one example of how law can engage with fermentation as a culturally embedded practice. While GI protections are not easily extended to newer or adapted products, the underlying logic of respecting microbial diversity and local knowledge could inform suitable legal and governance approaches.

4. Global perspectives on the regulation of artisanal fermentation

Recent reviews highlight the broader inconsistencies in how fermented foods are regulated across jurisdictions. Mukherjee and colleagues (2022) note that while global interest in fermented foods is surging, regulatory frameworks lag behind and often fail to account for the diverse microbial ecosystems involved in traditional practices.[18] They also observe that most legal instruments focus narrowly on safety, with limited attention to innovation, sustainability, or the cultural value of traditional foodways.[19] The case of European artisanal fermenters,

15. Regulation (EU) No 1151/2012 of the European Parliament and of the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs.
16. Vittorio Capozzi, Pasquale Russo and Giuseppe Spano, 'Microbial Information Regimen in EU Geographical Indications' (2012) 34 World Patent Information 229.
17. Capozzi, Fragasso and Russo (n 9).
18. Arghya Mukherjee and others, 'Global Regulatory Frameworks for Fermented Foods: A Review' (2022) 9 Frontiers in Nutrition.
19. ibid.

therefore, is not an isolated one. However, where EU food law lacks, regulatory frameworks from other regions can provide inspiration for improvement. Some countries have developed more targeted and culturally sensitive approaches to fermented foods, offering useful comparative models.[20]

South Korea stands out as one of the few countries with clearly defined microbiological and physicochemical standards for fermented foods.[21] The Korean Food Code includes product-specific parameters such as pH thresholds, viable lactic acid bacteria counts, and limits for pathogenic microorganisms.[22] These standards apply to a range of traditional products and are designed to reflect both safety requirements and the distinct microbial characteristics of fermentation.[23]

In the United States, fermented foods are regulated under a fragmented legal landscape, with no unified national policy. At the federal level, oversight is limited. However, a more relevant entry point for small-scale fermenters is the network of state-level cottage food laws, which allow individuals to produce and sell certain foods from home kitchens.[24] In Texas, for example, HB 1926 permits home-based production and sale of fermented vegetables, recognising their safety when properly prepared and enabling broader distribution within the state.[25] This scale-sensitive regulation supports local food systems and low-barrier entrepreneurship, though producers remain subject to proportionate labelling and safety provisions.

Japan offers an example of how artisanal fermentation practices can coexist with modern food systems. Miso, a fermented soybean paste central to Japanese cuisine, is produced using koji mould (*Aspergillus oryzae*) and traditional methods that vary by region. While mechanised production is widespread, some small-scale producers still use manual techniques such as the tray koji method, which involves wooden trays, hand-mixing, and careful temperature control.[26] These practices preserve microbial diversity and cultural heritage. Japan's food labelling standards regulate miso, among other traditional fermented foods, by composition but do not mandate production methods, allowing traditional processes to continue.[27] The official recognition of koji mould as a safe and culturally significant organism further supports these artisanal approaches.

At the international level, the Codex Alimentarius Commission has also issued fermentation-specific standards for a small but growing number of products such as kimchi (CXS 223-2001)[28], fermented cassava (CXS 334R-2020)[29], and tempeh (CXS 313R-2013)[30]. These documents include definitions and microbiological thresholds that account for the complexity of spontaneous or controlled fermentation, while acknowledging the cultural specificity of these foods. Although not legally binding, Codex standards provide a model for how international norms can accommodate microbial diversity.

Rather than transplanting any single system into the European context, these examples highlight the value of building regulatory models that recognise fermentation as a culturally situated and complex process. A more adaptive approach in the EU would involve developing fermentation-specific guidelines informed by traditional knowledge rooted in local practice as well as best practices from the countries where certain popular products originate from. These could be co-developed with producers and scientific experts, aligning safety goals with the preservation of microbial diversity and artisanal innovation.

In summary, small-scale artisanal fermentation is a growing sector that intersects with health, education and sustainability goals. Regulating it appropriately requires more than simply applying or expanding existing rules. It calls for frameworks that are proportionate, participatory, and attuned to the specificities of artisanal fermentation. Doing so would not only support consumer safety but also foster innovation and preserve the cultural richness of traditional culinary practices. As this research has shown, fermenters across Europe are already navigating legal ambiguity through precaution, peer networks, and informal standards of good practices. Yet without clearer, context-sensitive guidance, these efforts remain vulnerable to inconsistency and exclusion. Looking beyond Europe, regulatory approaches in countries such as South Korea and Japan demonstrate that it is possible to formalise fermentation without flattening microbial diversity or erasing traditional knowledge. A more supportive legal environment in the EU would recognise fermentation not only as a food safety concern, but as a site of cultural transmission, public engagement, and microbial stewardship.

20. ibid; Laulund and others (n 5).
21. ibid.
22. ibid
23. ibid
24. Victoria Bell, Jorge Ferrão and Tito Fernandes, 'Nutritional Guidelines and Fermented Food Frameworks' (2017) 6 Foods 65.
25. Texas House Bill 1926, 85th Legislature, Regular Session (26 May 2017) https://www.capitol.state.tx.us/tlodocs/85R/billtext/html/HB01926I.htm accessed 18 April 2025.
26. Ken-Ichi Kusumoto and others, 'Japanese Traditional Miso and Koji Making' (2021) 7 Journal of Fungi 579.
27. ibid.
28. Codex Alimentarius Commission, *Standard for Kimchi (CXS 223-2001)* (adopted 2001, amended 2017 and 2022) https://tinyurl.com/ymdp326k accessed 22 April 2025.
29. Codex Alimentarius Commission, *Regional Standard for Fermented Cooked Cassava-Based Products (CXS 334R-2020)* (adopted 2020) https://tinyurl.com/2swtwhy8 accessed 22 April 2025.
30. Codex Alimentarius Commission, *Regional Standard for Tempe (CXS 313R-2013)* (adopted 2013) https://tinyurl.com/2pacc3mv accessed 22 April 2025.