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Report Highlights: France's agricultural biotechnology sector is constrained by strict regulations and public opposition, despite the scientific community's support and the growing interest in NBTs. The dialogue on agricultural innovation and food security is evolving, driven by climate change and geopolitical factors, but significant challenges remain. France, a significant hub for medical biotechnology in Europe, faces stringent regulations, minimal research and development, and low public support for agricultural biotechnology. While the French government permits the import of genetically engineered (GE) products for animal feed, it restricts research and bans cultivation. This situation is unlikely to change in the short term.

Executive Summary

France currently has no commercial production or field trials of genetically engineered (GE) crops, with the last authorized GE field trial occurring in 2013. Research in agricultural biotechnology is minimal, offering no immediate prospects for commercialization. The French livestock sector heavily depends on imported GE feed, particularly soybeans, rapeseed, and corn sourced from South America, the United States, Canada, and Australia. Despite support from the scientific community and many farmers, consumer attitudes towards new technology remain predominantly negative. Anti-biotechnology groups have been known to destroy suspected GE crops, contributing to the absence of field trials. French media seldom highlight the potential benefits of biotechnology, such as reduced pesticide use and improved agricultural efficiencies, allowing opponents to strongly influence public opinion and overshadow the support from grain producers, animal feed compounders, the livestock industry, and scientists.

Animal biotechnology in France is primarily utilized for medical research, with the government opposing its application in animal breeding. Animal rights activists actively discourage discussions on the scientific benefits of this technology, including its potential to enhance animal welfare.

Despite widespread opposition to agricultural biotechnologies, interest in New Breeding Techniques (NBTs) is increasing, driven by climate change, recent droughts, and the Russian war in Ukraine, which have spurred discussions on agricultural production and food security. Newly appointed French Minister of Agriculture Annie Genevard, who took office in September 2024, has declared that innovation is essential for French agri-food businesses to enhance their competitiveness and gain international market share. To support this, she plans to back research and training and assist economic players with their projects. Genevard has also emphasized that healthier, more sustainable food will strengthen competitiveness, benefiting both the sector and consumers. However, she has not yet provided details regarding policy changes regarding the NBTs.1

[1] Food Industry News : "Healthier, more sustainable food also means more competitive food" (sialparis.com)

Acronyms used in this report are the following:

FAPB: French Association of Plant Biotechnology (AFBV or “Association Française des Biotechnologies Végétales”)

ANSES Agency for Food, Environmental and Occupational Health and Safety

ECJ European Court of Justice (or “Court of Justice of the European Union”)

CRISPR Clustered Regularly Interspaced Short Palindromic Repeats

EFSA European Food Safety Authority

EU European Union

GE Genetically Engineered

GMO Genetically modified organism, preferred term for French stakeholders to speak about genetically engineered organism

HCB High Council for Biotechnology

INRA French National Institute for Agricultural Research

MT Metric Ton

NGOs Non-Governmental Organizations

Glossary:

“Event” within the genetically engineering framework is the insertion of a particular transgene into a specific location in the chromosome. The term "event" is often used to differentiate genetically engineered crop varieties.

“Genetic Engineering” used in this report is the deliberate manipulation of an organism’s genetic material through transgenesis (insertion of foreign DNA).

“Innovative biotechnologies” is used here as a synonym for the European term for “New Breeding Techniques” (NBTs) and is generally referred to as gene editing. It excludes plants or animals resulting from traditional genetic engineering (transgenesis), known in Europe as genetically modified organisms (GMOs).

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CHAPTER 1 – PLANT BIOTECHNOLOGY

PART A – PRODUCTION AND TRADE

a) PRODUCT DEVELOPMENT

France is actively engaged in research, utilizing both genetic engineering and innovative biotechnologies within its national research networks. Projects encompass plant and animal genomic selection, innovative techniques, and the exploitation of plant metabolic diversity. However, France lags in experimentation and dissemination, with some French companies developing plants for non-EU markets offshore.

In agricultural biotechnology, France:

- Conducts very limited research involving transgenesis.
- Had one basic research project on innovative biotechnologies that concluded in 2020.
- Is active in genomic and varietal selection.

i. Limited Research in Agricultural Biotechnology

France's research in transgenic agricultural biotechnology is minimal due to poor public acceptance, misconceptions, and regulatory constraints. Financial risk aversion and halved public funds for domestic R&D since 1981 further hinder progress.

The Genius project (Genome Engineering Improvement for Useful plants of a Sustainable agriculture), an 8-year public-private partnership launched in 2012, aimed to demonstrate genome editing feasibility in various plant species. Despite a budget of 21.3 million euros, the project ended with limited benefits due to EU regulations.

In September 2018, INRAE released its Strategy for Plant Genome Editing Technologies, emphasizing the exploration of genome editing benefits and assessing associated risks. The strategy remains vague on field trials, with little political will to address activist sabotage.

ii. Genomics in Plant Breeding

Genomic tools are widely used by public labs and private seed companies, with less controversy compared to transgenesis and innovative biotechnologies.

iii. French companies developing biotech plants for non-EU markets

Some French companies develop new plants using transgenesis and innovative biotechnologies outside Europe for non-EU commercialization. For instance, Calyxt, a U.S. subsidiary of French Cellectis S.A., developed a gene-edited soybean variety commercialized in the U.S. in 2019. Additionally, Argentina authorized GE wheat production in collaboration with French seed company Florimond Desprez in 2022.

iv. Laboratory research for medical applications

GE plants and plant cells are used in laboratories to develop pharmaceutical proteins, such as insulin and growth hormones, and more complex molecules for research purposes.

Commercialization is not expected in the medium term

Commercialization of new GE plant varieties is unlikely soon due to:

- Constraints on public institutions from the absence of field trials and lack of political support.
- High risks and regulatory costs of commercialization.
- Waning private sector interest due to vandalism and EU approval process uncertainties.

b) COMMERCIAL PRODUCTION

France does not engage in the commercial production of genetically engineered (GE) crops, and this is unlikely to change in the medium term. During his 2017 presidential campaign, President Macron stated that he would not permit the cultivation of GE crops. Currently, MON810 Bt corn is the only GE plant approved for cultivation in the EU, but its cultivation has been banned in France since 2008.

In 1998, France had 4,445 acres of GE corn planted. This number dropped to zero during the European de facto moratorium between 1999 and 2004. Cultivation briefly resumed between 2004 and 2007, reaching 54,363 acres before falling back to zero in 2008. Prior to the ban, the cultivation of transgenic plants in France was minimal; in 2007, GE corn represented only 0.7% of the total crop.

A GE potato was authorized in 2010, but it was never cultivated in France. Several thousand acres are currently cultivated with varieties derived from mutagenesis, which involves techniques that introduce genetic mutations into organisms. The recent commercialization of herbicide-tolerant mutated varieties (VRTH) has drawn public attention, with some activists labeling them as "hidden GMOs." In France, a variety of sunflower and rapeseed, made tolerant to herbicides through mutagenesis, are grown. Additionally, France cultivates mutated sunflower varieties with high oleic acid content, making non-mutated sunflowers nearly impossible to find on the market.[2]

On October 12, 2021, President Macron unveiled a new 2030 economic recovery plan for France, with a total budget of 30 billion euros. Given the significant challenges facing the food and agriculture sector, the French government plans to allocate 2 billion euros to digital, robotics, and genetics to "accelerate the third agricultural and food revolution." According to the government, research projects in genetics will help develop environmentally friendly species and crops. While many agricultural stakeholders, particularly those representing larger interests, support the government plan, environmental organizations and smaller French farmers accuse the government of opening the door to GMOs.

[2] Following anti-GMO groups' legal complains, France is currently discussing the GMO status of mutagenesis crops. More on this subject in the Innovative Biotechnologies section of this report.

The inclusion of agricultural biotechnology in President Macron's recovery plan is groundbreaking in terms of fostering dialogue on the role of technology, genetics, and robotics in ensuring the future competitiveness of the French agricultural sector. Many recognize that the challenges of climate change and food sovereignty are closely linked to the role of technology and science.

c) EXPORTS

France does not export any GE plants.

d) IMPORTS

Most French biotech imports consist of whole soybeans and soybean meal from the Americas, primarily for use as animal feed ingredients. GE products account for an estimated 80% of total animal feed ingredient imports. France also imports GE rapeseed from Canada and small quantities of GE corn and corn processing by-products.

Trade data do not differentiate between conventional and GE varieties. The graphs presented in this section include both categories. In each section, a table provides the share of GE crops from France's main suppliers.

France imports on average between 3.1 and 3.5 million metric tons (MMT) of soybean products per year, of which 80% are GE.

As illustrated in the two graphs bellow, in the last five years, France imported on average:

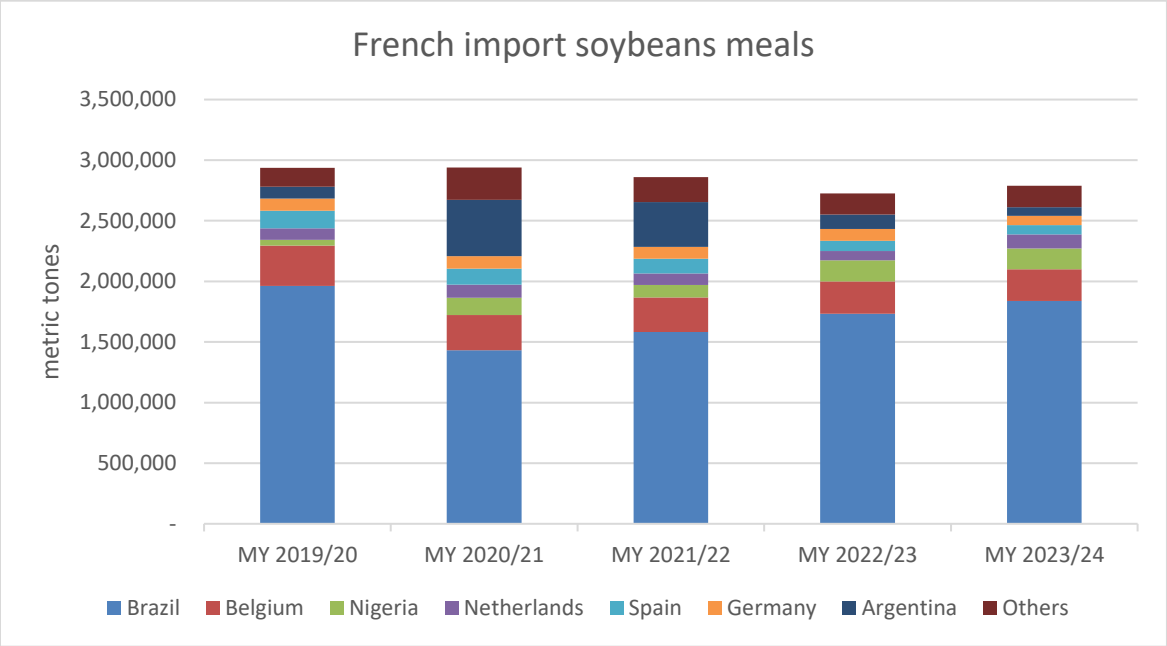
- 2.9 million metric tons (MMT) of soybean meal per year. The share of GE soybean meal out of France's total soybean meal imports is estimated at 80%.
- 527,000 MT of whole soybeans per year. The share of GE soybeans out of total imports is estimated at more than 90%. Historically, Brazil, Ukraine (some French NGOs claim that as much as half of Ukraine's soybeans are GE), Canada, and the United States have been the main soybean suppliers to the French market. Currently, the United States is the second-largest supplier while Canada has drastically reduced its exports to France in MY 2023/2024. In recent years, Togo has gained market share by exporting non-GE and/or organic soybeans.

France relies on imported soybean products for feed in the livestock and poultry sectors. Domestic production of soybeans and substitutes is limited, and there is a strong demand for protein in compound feed formulations. French importers generally decide on where to source soybean products based on price and, to a lesser extent, on protein content.

French demand for non-GE soybean meal is estimated at 20% of the total French market. Aside from the non-GE soybeans grown domestically in the EU, the main suppliers of non-GE soybeans include Brazil, India, Togo, and Nigeria.

Historically, the price premium for non-GE soybeans has varied between 60 and 100 euros per MT Premium prices are mainly due to limited supplies and the higher logistical costs of segregating non-GE soybeans in transportation and storage.

Figure 1



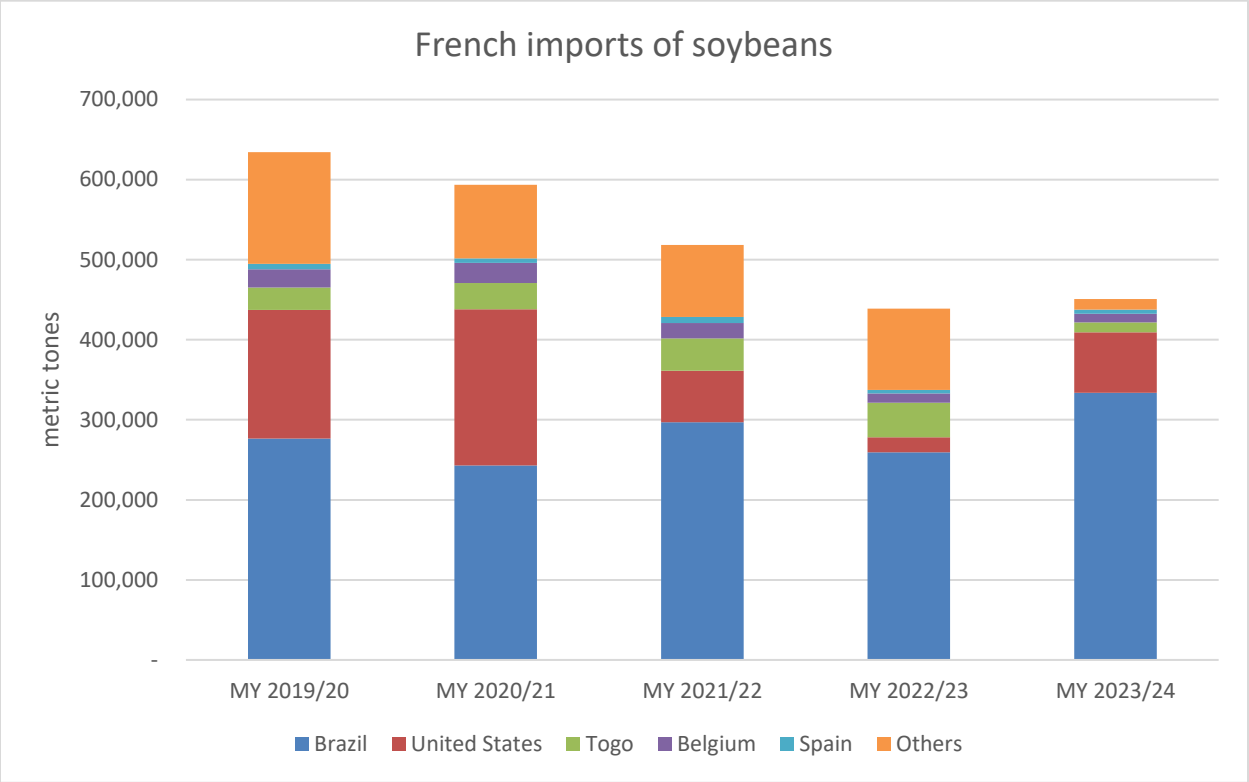
Source: Trade Data Monitor

After two years of increasing feed prices in 2021 and 2022, the IPAA indicator, which calculates the average cost of raw materials utilized for livestock feed, fell in 2023 to within the range of the 2006-2010 average.

The shortage of non-GE soybeans has significantly impacted the cost of many French products with a Geographic Indication (GI) designation. Many GI meat and dairy products have a strict non-GE feed requirement. French agriculture is implementing a strategy to encourage the production of locally produced non-GE protein crops to replace imports of GE soybeans. Through subsidies and incentives under the EU Common Agricultural Policy (CAP), French production of non-GE protein crops increased from 110,000 MT in MY 2013/14 to 436,000 MT in MY 2023/24.

The European Union is also seeking to increase local production of plant proteins. For more information, please see the report on The Development of Plant Proteins in the European Union released by the European Commission in November 2018. It is particularly noteworthy that the final report on the EU Protein Strategy does not discuss how EU restrictions on agricultural biotechnology adversely affect the objectives of breeding more productive, resilient crops that can adapt to the climatic and environmental conditions of the EU.

Figure 2



Source: Trade Data Monitor

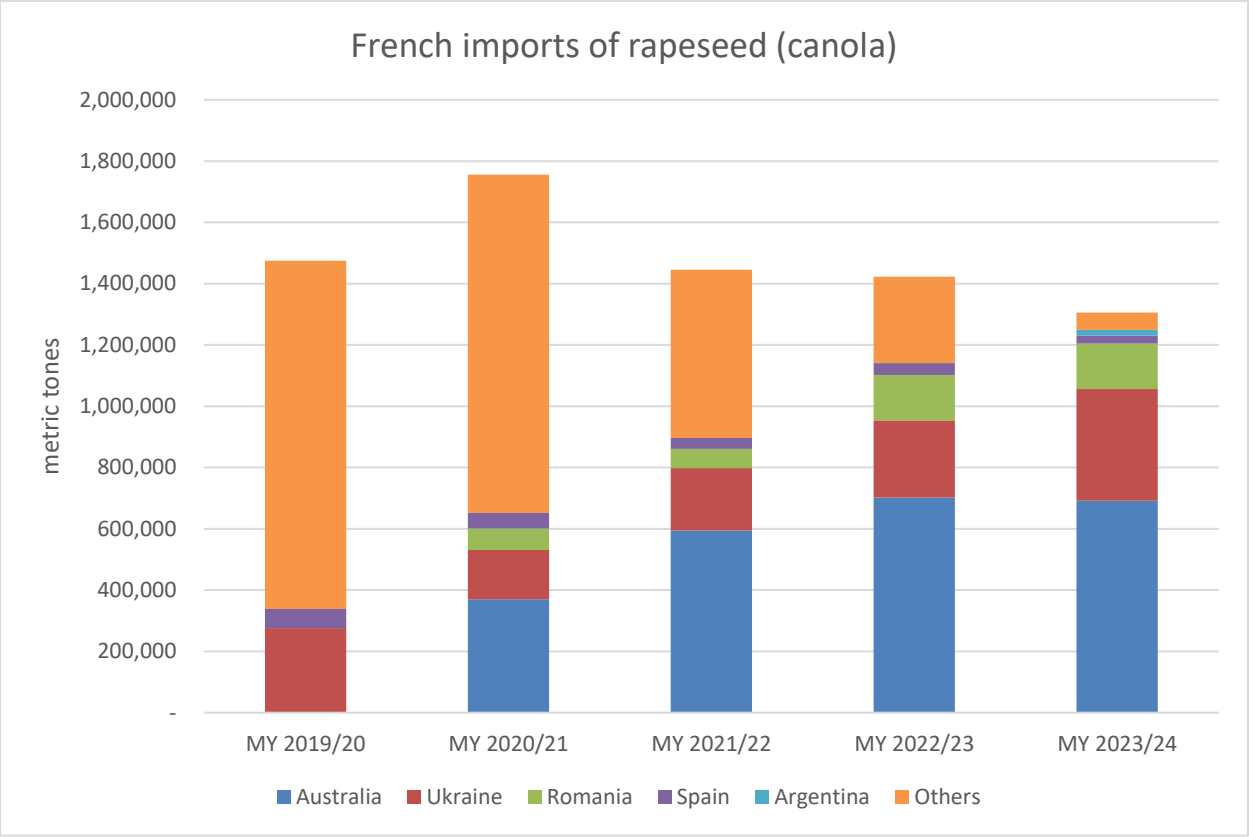
Table 1 - Share of GE Soybeans in Total Soybean Production

Country	Share of GE Soybeans
Argentina	100%
Brazil	94%
Canada	90%
India	0%
Spain	0%
Togo	0%
Ukraine	0%
United States	95%

Source: ISAAA 2019

France imports GE canola (rapeseed) from Australia, Ukraine, Romania and Spain. Canada used to have an important share in French rapeseed imports, however in the last three years the Canadian canola became uncompetitive for the European and f\French market, due to high prices.

Figure 3



Source: Trade Data Monitor

Table 2 - Share of GE Rapeseed in Total Rapeseed Production

Country	Share of GE Rapeseed
Australia	20%
Canada	95%
Romania	0%
Spain	0%

Country	Share of GE Rapeseed
Ukraine	10-12% (estimated)

Sources: ISAAA 2018, FAS, and national governments

France imports small quantities of corn from countries that produce GE corn.

In the last five years, France imported on average 567,000 MT of corn per year. While corn imports have been following a downward trend as feed demand fluctuates, Table 1 shows that GE-corn imports have been increasing over the last two years as Spanish, South African, and US exports are picking up.

Table 3 - Origin of France's Imports of Corn

Year	Total World Imports (Metric Tons)	Potential GE Imports (Metric Tons)	Potential GE Imports (%)
2018/2019	860,412	11,458	2.2
2019/2020	675,505	7,752	1.8
2020/2021	463,203	26,932	1.7
2021/2022	482,786	17,767	5.4
2022/2023	690,188	87,518	3.8

Source: Trade Data Monitor

Table 4 - Share of GE Corn in Total Corn Production – 2018

Country	Share of GE Corn
South Africa	87%
Spain	35%
United States	92%

Source: ISAAA and FAS (2018)

France imports small quantities of corn processing by-products from countries that produce GE corn. French imports of Distiller's Dried Grains with Solubles (DDGS) are mainly from the Netherlands, Belgium, and Germany. The United States exported only negligible quantities of DDGS in the past five years.

Table 5 - Origin of France's Imports of DDGS

Year	Total World Imports (Metric Tons)	Potential GE Imports (Metric Tons)	Potential GE Imports (%)
2018/2019	234,562	122,118	5.2
2019/2020	256,246	7,399	2.9
2020/2021	311,791	6,495	2.1
2021/2022	329,830	7,239	2.2
2022/2023	232,254	1,553	0.7

Source: Data Trade Monitor

Growing Imports of US GE Cotton

Parallel to feed imports, France also imports small but increasing quantities of cotton. In 2023, the United States was France's second-largest supplier after Turkey, with 92% of U.S. cotton planted being genetically engineered.

Table 6 - Origin of France's Imports of Cotton

Year	Total World Imports (Tons)	Potential GE Imports (Tons)	Potential GE Imports (%)
2018/2019	7,732	684	9
2019/2020	8,643	879	10
2020/2021	8,165	1,513	17
2021/2022	8,751	2,180	26
2022/2023	7,609	1,535	21

GE cotton, which does not require special labeling, benefits from wider acceptance or at least indifference from French consumers and authorities. Euro banknotes are mostly made from GE cotton.

e) FOOD AID

France provides food aid in various forms, including food, money, equipment, seeds, and veterinary services, explicitly excluding GE products. This aid is offered both as planned assistance and emergency relief during crises, whether climatic, economic, social, or political. The distribution channels for this aid are:

- international organizations**:** Over 75% of the total budget, including entities like the World Food Program and the International Committee of the Red Cross.
- non-governmental organizations (NGOs): 15-20% of the total budget, with organizations such as Action Against Hunger.
- direct aid: 5-10% of the total budget.

For the period 2021-2027, France's food aid budget is 869 million euros, reflecting a 48% increase from the previous budget period to address the heightened demand due to the COVID-19 crisis.

f) TRADE BARRIERS

Cultivation Ban: Since 2008, France has banned the commercial cultivation of GMOs, a stance unlikely to change in the medium term. The country has invoked the precautionary principle, safeguard clauses, and emergency measures under Directive 2001/18/EC and Regulation 1829/2003 to ban the cultivation of MON810 maize. Law n°2014-567 of June 2, 2014, specifically bans genetically modified corn varieties. Despite successive decrees

being annulled by the Supreme Court, the law passed in June 2014 remains incompatible with EU regulations. Since 2015, France has utilized Directive 2015/412 to request exclusion from the EU's geographical scope of GMO authorizations. On March 3, 2016, the European Commission adopted a decision modifying the authorization scope, prohibiting MON810 maize cultivation in France and other requesting regions.

Import Ban: In 2015, the European Commission proposed a regulation allowing EU member states to restrict or ban the use of already authorized GE crops or products, based on reasons other than those assessed at the EU level. France opposed this opt-out proposal, citing its contradiction to single market principles and potential incompatibility with international trade agreements. The French Government aims to avoid additional stress on the livestock and poultry sectors, which already face challenges in sourcing non-GE feed ingredients. Consequently, French policymakers maintain an ambiguous stance, neither fully banning nor fully accepting GE products. FNSEA, a major farm union, also opposes the opt-out proposal, advocating for common rules within the EU market. Anti-biotech activists criticize the proposal, arguing that member states would struggle to find justifications compatible with EU legislation and international obligations.

PART B - POLICY

a) REGULATORY FRAMEWORK

i. Table of legal terms

Legal Term (in official language)	Legal Term (in English)	Laws and Regulations where term is used	Legal Definition (in English)
Organism génétiquement modifié (OGM)	Genetically Modified Organisms (GMO)	• Code de l'environnement, articles L. 125-3, L. 531-1 à L. 537-1, D. 531-1 à R. 536-11 • Code rural et de la pêche maritime, articles L. 250-1 et suivants, L. 251-18-1, L. 663-1 à L. 663-4, D. 663-1 à D. 663-6.	• An organism, with the exception of human beings, in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. • An organism (animal, plant, bacterium) whose genetic material (set of genes) has been modified using a technique known as "genetic engineering" to confer a new characteristic.

European regulations mandate that a GE product cannot be placed on the market or released into the environment without prior authorization, following a case-by-case risk assessment for health and environmental impacts, requiring monitoring, traceability, and labeling. France adheres to the EU biotechnology regulatory framework. Key regulatory texts include:

- Directive 2001/18/EC: On the deliberate release of GMOs into the environment.
- Regulation (EC) No 1829/2003: On genetically modified food and feed.
- Regulation (EC) n°1830/2003: Concerning the traceability and labeling of GMOs.
- French national legislation on GMOs is encapsulated in the Environmental Code and the Rural and Maritime Fishing Code.

ii. Responsible government ministries and their role

The French Ministry of Agriculture & Food and the Ministry for Economy & Finance, through the Fraud Control Office (DGCCRF), enforce GMO commercialization and cultivation regulations. Controls include:

- Crops: Ensuring compliance with the GMO cultivation ban.
- Seeds: Checking for GMO presence and labeling compliance.
- Foodstuffs and Animal Feed: Verifying the absence of unauthorized GMOs and labeling compliance.

The Ministry of Higher Education, Research and Innovation issues approvals for GMO use in research, development, and teaching. The Ministry of Health and the Ministry of Ecological Transition have advisory roles regarding health and environmental issues linked to GMOs.

iii. Role and membership of the biosafety authority

Prior to 2022, the High Council for Biotechnology (HCB) and ANSES were responsible for monitoring and risk assessment of GE products. The HCB was disbanded on January 1, 2022, with its scientific expertise transferred to ANSES and its socio-economic and ethical missions distributed among ANSES, the French Economic, Social and Environmental Council, and the French governmental advisory council on bioethics issues.

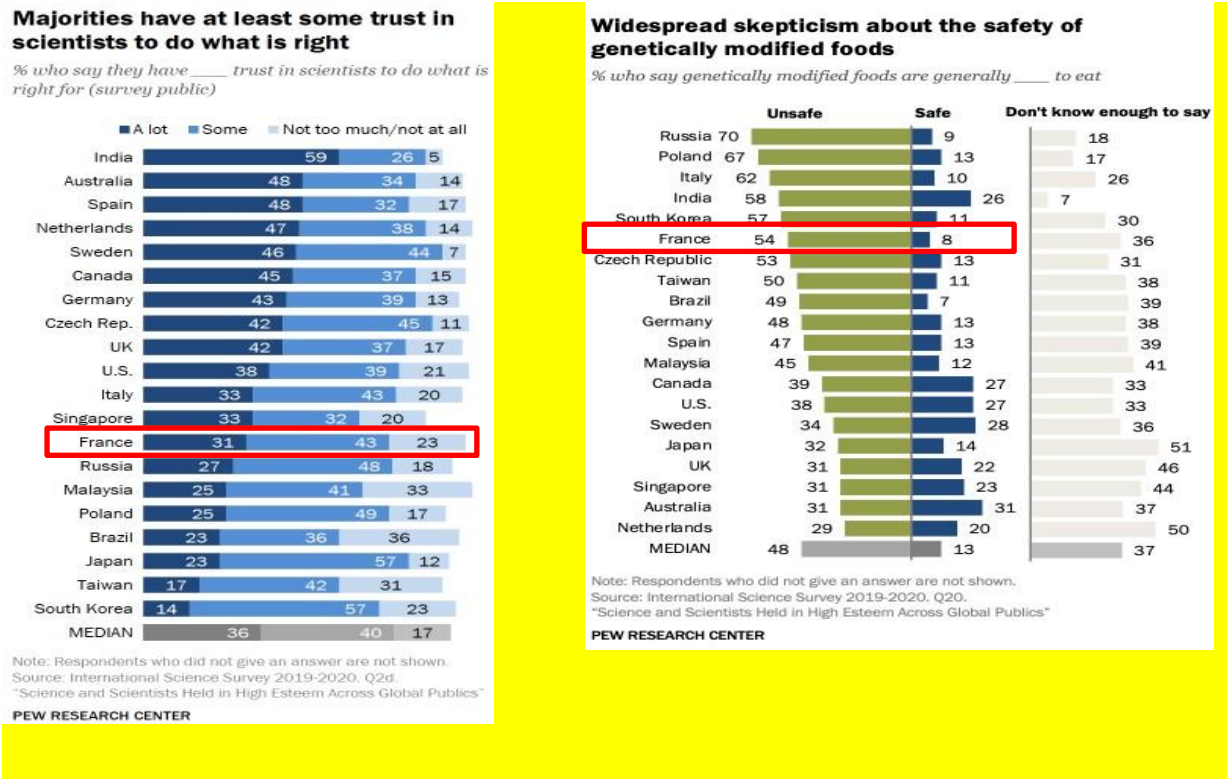
In early 2024 ANSES called for adapted regulation on New Genomic Techniques particularly in the field of plant variety selection. ANSES has conducted an assessment of the issues related to these new genomic techniques to inform authorities and stakeholders in current discussions on the evolution of European GMO regulations. The agency proposes a case-by-case evaluation approach and recommends a comprehensive monitoring system.[3]

iii. Political factors influencing regulatory decisions

Biotech opponents have effectively mobilized public opinion, influencing political and regulatory decisions through fear and misinformation. The agrifood sector faced significant challenges in 2022, including droughts, heatwaves, and the Ukrainian crisis, emphasizing food sovereignty and the potential benefits of agricultural technologies and NBTs. President Macron, reelected in April 2022, has publicly supported NBTs, advocating for innovations that enhance productivity and resilience.

[3] Nouvelles techniques génomiques : l'Anses appelle à une réglementation adaptée | Anses - Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail

Figure 4



iv. Distinctions between regulatory treatments

France has authorized GE imports to meet the demand for protein-rich animal feed ingredients but bans research and cultivation of biotech crops. The EU manages the approval process for biotech products, but France can implement its own regulations if consistent with EU rules. Despite EU approval, France has banned MON810 corn cultivation.

iv. Legislation and regulations affecting U.S. trade

Legislation affecting U.S. trade includes the national ban on GE crop cultivation and the non-biotech labeling system. During its EU Council Presidency in 2022, France advocated for "mirror clauses" for EU food and agricultural imports, potentially impacting GE products entering the EU market.

v. Timeline for approvals

European Directive 2001/18/EC and Regulation (EC) No 1829/2003 provide the framework for GE plant release and market authorization. For more information, refer to the USDA EU-28 Agricultural Biotechnology Annual report.

b) APPROVALS

All genetically engineered (GE) events approved for feed and food use under Regulation EC 1829/2003 are authorized in France. The complete list of these products, including those pending authorization, is available on the European Commission's website. MON810 corn remains the only GE plant approved for cultivation in the EU, but its cultivation is banned in France under national law and Directive (EU) 2015/412.

c) STACKED OR PYRAMIDED EVENT APPROVALS

EU regulations, specifically Regulation (EU) No 503/2013, Annex II, apply to France. The risk assessment for stacked events must include:

- Stability of the events
- Expression of the events
- Potential interactions between the events

Applicants must provide a risk assessment for each single event or refer to previously submitted applications.

d) FIELD TESTING

In France, the deliberate release of a GE plant into the open environment, even for research, requires prior approval from the Ministry of Agriculture. The Ministry considers the High Council for Biotechnology (HCB)'s opinion on potential public health and environmental risks before granting authorization. Additionally, the Ministry must hold a public consultation and notify local authorities about the location of test plots. Authorizations can be amended or suspended based on new information.

Twenty years ago, there were nearly 800 field experiments, but the last open-field test occurred in 2013. Currently, no field tests are conducted in France due to the risk of sabotage by anti-GE activists. These activists have destroyed property and launched media campaigns to intimidate biotechnology research. The lack of punitive action against such sabotage has discouraged both public and private research organizations. Consequently, some French laboratories conduct GE plant field tests in other countries.

e) INNOVATIVE BIOTECHNOLOGIES

On July 25, 2018, the European Court of Justice (ECJ) ruled that organisms created through genome editing techniques are to be regulated as GMOs in the EU. On November 8, 2019, the Council requested the European Commission to study the status of novel genomic techniques under EU law and propose actions if necessary.

On April 29, 2021, the European Commission published a report concluding that the 2018 ECJ directive is not suitable for newer biotechnology products (New Breeding Techniques) and recommended targeted policy action. The report noted that genome editing could contribute to the European Green Deal's Farm to Fork and Biodiversity Strategies.

The 2018 ECJ ruling and its 2021 dismissal by the European Commission have caused confusion in France. Environmentalist lobbies have pushed for mutagenesis bans based on the 2018 directive, leading to legal

challenges. The French State Council sided with environmentalists, making it compulsory for the government to ban mutagenesis, despite potential internal market disruptions and sanctions. On October 27, 2022, the First Advocate General of the Court of Justice of the European Union ruled that random mutagenesis applied in vitro must be excluded from EU GMO regulations. The French government has not officially responded, leaving France's stance on mutagenesis unclear. The European Commission's impact assessment on NBTs is expected in 2024.

f) COEXISTENCE

French legislation aims to limit the spread of GE plants outside designated zones. Cultivation, harvest, storage, and transportation of GE crops are subject to technical rules set by the Minister of Agriculture, including safety zones. When GE corn was grown in France, a buffer zone of 24 rows and 50 meters was enforced. Research programs studied coexistence under real field conditions, and a guide for GE corn cultivation was published.

French legislation mandates nationwide "biological monitoring" to observe plant health and evaluate agricultural practices, including GE use. The Committee for Biological Monitoring of the Territory, created by the 2008 law on GE plants, coordinates this effort and submits annual reports to Parliament. GE crop producers are liable for accidental spread causing economic harm to non-GE crop producers and must obtain liability insurance, though enforcement mechanisms are inadequate)

g) LABELING AND TRACEABILITY

i. The Voluntary "GE Free" Labeling System

French labeling regulations comply with EU requirements for labeling food and feed produced from or containing GE products[4]. The French Fraud Control Office (DGCCRF) enforces these regulations. Since 2012, a voluntary "GE Free" labeling system has been in place, with criteria varying based on ingredient origin (plant, animal, or bee).

- Plant Origin: Ingredients can be labeled "GMO-free" if derived from raw materials containing a maximum of 0.1% GMOs.
- Animal Origin: Products may be labeled "from animals fed without GMOs (<0.1%)" or "from animals fed without GMOs (<0.9%)."
- Beekeeping Origin: Ingredients may be labeled "GMO-free within a radius of 3 km" if the distance between hives and GE fields is maintained.

Reference to the absence of GMOs will appear most often in the list of ingredients; however, GE free labels can also be printed on the main visual of the packaging should the GE-free ingredient represent more than 95 % of the food item.

ii. Voluntary Private Initiatives

[4] USDA EU-28 Agricultural Biotechnology Annual report

Food products from animals fed with GMOs are not labeled to reflect their GE status. However, there is growing interest in non-GMO labeling initiatives from private companies to meet consumer demand for sustainability and transparency.

h) MONITORING AND TESTING

French government agents perform random monitoring and testing on food products, feed products, seeds, and crops to ensure compliance with regulations. GE product developers must also monitor their products for potential non-intentional effects. The latest reported GE incident in France occurred in 2018 with unauthorized transgenic rapeseed.

i) LOW LEVEL PRESENCE POLICY

In 2011, the European Commission established a "technical zero" tolerance of 0.1% for unauthorized GE products in feed, applicable only to GE products authorized in a non-EU country and pending EU authorization. This tolerance does not apply to food and seeds.

j) ADDITIONAL REGULATORY REQUIREMENTS

French legislation requires GE farmers to notify surrounding farmers and declare GE crop locations to the government, with information entered into a public register. This rule has been controversial as activists have used the register to sabotage open-field trials. Penalties for not declaring GE crop locations include fines and incarceration, but enforcement has been inconsistent.

k) INTELLECTUAL PROPERTY RIGHTS

France supports the plant certificate system under the International Union for the Protection of New Varieties of Plants (UPOV) rather than the patent system. French law limits the patentability of living organisms, with specific articles in the Code of Intellectual Property addressing this.

Article L611-19 (in French) of the Code of Intellectual Property states that "products obtained exclusively through essentially biological processes, the elements that compose them and the genetic information they contain" are not patentable.

Article L613-2-3 (in French) of the Code of Intellectual Property states that when a plant obtained through essentially biological processes has the same characteristics as a patented biological material, the patent does not apply to this plant.

In December 2018, the European Patent Office (EPO) reversed its 2017 decision establishing that European patents shall not be granted for plants or animals exclusively obtained by means of "essentially biological processes." The French seed industry deplored this reversal that creates legal uncertainty for plant breeders due to the contradiction between French and EU regulations.

The EU Parliament voted to ban the patentability of NGT-1 plants and products (a ban also extended to plants and products currently exempt from GMO legislation) through several amendments, on February 7, 2024, and again on April 24. Furthermore, the Parliament invited the Commission to present, by June 2025 at the latest, a report on "the role and impact of patents on breeders' and farmers' access to diverse plant reproductive material, as well as on innovation and, in particular, on opportunities for small and medium-sized enterprise."

The French Association of Plant Biotechnology (FAPB) emphasizes the need for essential protection of innovation while allowing access to phytogenetic resources. They propose a balanced framework to promote access to patented techniques and materials, seed diversity, and non-patented crop production. The FAPB has outlined several proposals to facilitate the identification, access, and use of intellectual property, urging the EU Council to adopt the NGT proposal with modest clarifications and without patent-related provisions that lack impact assessment.[5]

l) CARTAGENA PROTOCOL RATIFICATION

France ratified the Cartagena Protocol on Biosafety (CPB) in 2003, ensuring the safe handling, transport, and use of living modified organisms. The competent national authorities include the Ministry of Higher Education and Research, the Ministry of Ecology, the Ministry of Economy, ANSES, and the Ministry of Agriculture.

m) INTERNATIONAL TREATIES AND FORUMS

As an EU member state, France aligns its position with the EU in international organizations such as the Organization for Economic Cooperation and Development (OECD), Food and Agriculture Organization of the United Nations (FAO), European and Mediterranean Plant Protection Organization (EPPO), and Codex Alimentarius. France actively promotes its views on biotechnology in these forums. In May 2018, the HCB released comments on the OECD's document on environmental risk assessment of GE plants, recommending more consideration for biodiversity and long-term effects.

PART C – MARKETING

a) PUBLIC/PRIVATE OPINIONS

Public awareness of agricultural biotechnology in France is limited. Since 2016, mainstream media has extensively covered anti-biotech group actions, rarely explaining the scientific risks or potential benefits of these innovations for agriculture and food production. There is a significant gap between the acceptance of medical or "white" biotechnology and agricultural or "green" biotechnology. Medical applications of DNA sequencing and genome editing receive much wider support compared to agricultural applications. While risk and ethical questions are relevant to both, few journalists investigate green biotechnology with the same objectivity as medical journalism.

[5] Déclaration de l'AFBV sur les discussions relatives aux NGTs dans le Conseil de l'UE - AFBV

When French microbiologist Emmanuelle Charpentier and American biochemist Jennifer Doudna won the Nobel Prize for Chemistry in 2020 for the CRISPR-Cas system, the French media celebrated their achievement. However, CRISPR-Cas techniques in agriculture and forestry garner little public interest.

The French government differentiates between “first generation” GE plants, which include herbicide and insect-resistant plants and are opposed, and “second generation” GE plants, which could bring direct consumer or environmental benefits, such as enhanced nutritional value, reduced nitrogen use, or improved water efficiency. There is some openness to discussing “second generation” plants, but stringent regulations remain.

A paradigm shift occurred in 2021 and 2022 due to food and feed shortages caused by the pandemic, the Ukrainian crisis, and extreme weather. The French public research network faced criticism for lagging in green biotechnology research. In February 2022, INRAE CEO Philippe Mauguin defended public research, stating that INRAE is preparing a program to use genetic selection tools to improve varieties for better climate change resistance. The program has yet to be announced.

Anti-biotech activists continue to oppose research and imports. Various civil society organizations have fought against agricultural biotechnology since the 1990s, viewing it as risky and favoring the precautionary principle. These groups are skeptical of new technologies, believing biotechnology is dangerous, offers little public benefit, and is driven by profit-seeking large companies. They often discredit regulatory experts by suggesting conflicts of interest while not applying the same transparency standards to their own lobbying and campaigns. Some groups have even committed or condoned illegal acts to further their cause. Public opinion generally supports anti-biotech groups, viewing them as protectors of the public good against large corporations. Politicians often maintain neutral positions to avoid political repercussions.

Since 2013, anti-biotech activists have destroyed imported products, including seeds and conventional crops. In 2019, activists blocked a shipment of 50,000 tons of GE soy from Brazil at the Port of Sète, citing deforestation in the Amazon. In November 2021, "voluntary reapers" destroyed bags of herbicide-tolerant sunflower seeds. The judiciary system struggles with consistent responses to these offenses. While some activists have been discharged, others have faced significant fines and suspended prison sentences.

In April 2021, the European Commission published a study on new genomic techniques, concluding that the “GMO Directive” was not suitable for New Breeding Techniques (NBTs). The study received mixed reviews, with some branding NBTs as “New GMOs.” French opponents claim the European Commission is not respecting the precautionary principle and is opening doors to new risks.

On November 22, 2022, Greenpeace mobilized in 23 French cities, urging supermarkets to pressure the government for mandatory labeling on products containing GMOs, including NBTs. Greenpeace argues that NBTs carry the same risks as conventional GMOs and reinforce the economic power of multinationals, contributing to agricultural industrialization and farmer dependence.

b) MARKET ACCEPTANCE/STUDIES

Acceptance of GE crops in France varies among consumers, retailers, the food industry, and farmers.

- **Consumers:** Consumer attitudes towards GE products are primarily negative. A 2019 Eurobarometer survey on food safety indicated that only 28% of French consumers rank “GE ingredients in food or drinks” as a top concern. Media coverage has focused more on pesticides, not highlighting biotechnology’s potential to reduce pesticide use. A 2022 survey by IFOP revealed strong ambivalence towards science, with 81% of respondents holding unfavorable opinions on GMOs and 44% believing GMOs have proven harmful effects.
- **Retailers:** Due to negative consumer perceptions, retailers, especially major supermarkets, promote their non-GE credentials to avoid negative publicity. Some stores are reducing meat derived from animals fed with GE products.
- **Food Industry:** European regulations on mandatory biotech labeling have led the French food industry to reformulate products to exclude potential GE ingredients. The industry is also developing initiatives to reduce GE feed use in livestock production.
- **Farmers:** The animal production sectors depend heavily on imported soybean products for feed, with high market acceptance of GE products. Feed grain producers support GE varieties for yield gains and lower production costs. However, due to negative consumer perceptions, acceptance of biotech cultivation is lower among fruit and vegetable producers and other sectors with direct customer links. Organic farmers are generally opposed to GE, seeking to strengthen organic market presence.

CHAPTER 2 – ANIMAL BIOTECHNOLOGY

PART D – PRODUCTION AND TRADE

a) PRODUCT DEVELOPMENT

France uses animal biotechnology and cloning in research units:

- To study diseases. Animal models of human diseases are produced by biotechnologies, such as genome editing and genetic engineering.
- To produce tissues or organs from GE pigs (xenotransplantation);
- To produce proteins of pharmaceutical interest (blood factors, antibodies, vaccines) in the milk of mammals or in egg whites from chicken eggs. Proteins can also be produced by animal cells in-lab;
- To improve animal breeding.

b) COMMERCIAL PRODUCTION

No GE animals for food use are commercialized in France.

There is one company producing GE larvae for biocontrol purposes in a confined laboratory environment. Created in 2005 and spin-off of the Natural History Museum and the French National Centre for Scientific Research CNRS, Watch Frog modifies the genome of amphibians so that larvae emit fluorescence in the presence of certain pollutants. The company is part of the US Environmental Protection Agency's ToxCast program to detect endocrine disruptors.

WatchFrog's testing method has received the Organization for Economic Co-operation and Development's seal of approval as the organization considers that by using embryos at a very early stage, WatchFrog does not work with animals but micro-organisms and. Following an evaluation, the Ministry of Research granted, in 2008 and renewed in 2013, a group I approval for the use of GEXenopus laevis larvae (detection of polluting or pharmaceutical substances) and medaka larvae (detection of estrogenic substances). Following an additional evaluation carried out by the HCB, another group I approval was granted "for the flow detection equipment of pollutants or toxic substances by the use of transgenic larvae of class 1."

c) EXPORTS

A French company called Cryozootech was active in exporting cloned horses, but this company has ceased operations.

d) IMPORTS

It is widely believed that France has imported semen and embryos from cloned animals or their offspring. The specific quantity of these imports is not available. In 2015, an expert report submitted to the European Commission admits that there is a "possibility" that food from clone offspring may be found on the plates of European consumers. This is due to imports of meat and milk from third countries, but also because of imports of live animals and genetic material used for animal reproduction. Pauline Constant, a spokesperson for BEUC (a European Consumer Organization) notes that "Europeans are undoubtedly unknowingly eating meat from the descendants of clones in the absence of traceability and labeling."

e) TRADE BARRIERS

Public and governmental opposition limits the use of products obtained through animal biotechnology and cloning.

PART E – POLICY

a) REGULATORY FRAMEWORK

No biotech animals are approved for feed or food use in the EU, as no applications have been submitted. Food from cloned animals falls under the "Novel Food Regulation" and requires authorization.

b) INNOVATIVE BIOTECHNOLOGIES

France has no specific regulation for innovative biotechnologies in animals. The HCB and the Veterinary Academy of France have called for updated EU legislation to foster innovation and address the rapid evolution of genome editing technologies.

c) LABELING AND TRACEABILITY

Laboratory animals developed through biotechnology are labeled and traced, with no release into the environment. Cloned sport horses are released. A 2014 incident involved a genetically modified ewe lamb sent to a slaughterhouse, deemed a malicious act but with no health risks.

d) INTELLECTUAL PROPERTY RIGHTS

French regulations align with the EU.

e) INTERNATIONAL TREATIES AND FORUMS

France aligns its position with the EU in international organizations such as the OECD, OIE, FAO, and Codex Alimentarius, actively promoting its views on animal biotechnology.

PART F – MARKETING

a) PUBLIC/PRIVATE OPINIONS

France's livestock industry does not favor the commercialization of GE animals, clones, and their offspring for food or agricultural purposes but shows strong interest in animal genomics and marker-assisted selection for breeding. Cloning could gain acceptance for endangered species and pets, but current legislation prohibits it. Animal rights activism has become more assertive, targeting research facilities, farms, and slaughterhouses. Groups like L214 and DxE influence public opinion against industrial farming and animal biotechnology.

b) MARKET ACCEPTANCE/STUDIES

Market acceptance of GE animals, clones, and their offspring is low among producers and consumers. Public awareness of biotech research on insects is also low.

CHAPTER 3 – MICROBIAL BIOTECHNOLOGY

PART G – PRODUCTION AND TRADE

Obtaining information about the development and production practices of GE microorganisms is challenging both in France and at the European level. Microbial biotechnologies focus on microorganisms used as "tools" in manufacturing, transformation, or degradation processes for industrial purposes. The aim is to develop plant species with improved characteristics to reduce the use of fertilizers and pesticides, making them more resistant to pests and diseases, which should help reduce greenhouse gas emissions.
Additionally, these plants can be cultivated on polluted soils or irrigated with saltwater, and they require less water for crops. Microbial biotechnology plays a crucial role in the bio-industry, utilizing various bacteria that produce enzymes. A new sector, known as cellular agriculture, is also emerging within microbial biotechnology

a) PRODUCT DEVELOPMENT

The addition of yeast to dough to make it rise, or to beer to make it ferment, the winemaking process, and the aging of certain cheeses: all these traditional and often empirical "technologies" can, in the etymological sense, be linked to biotechnologies. In the 19th century, Louis Pasteur (1822-1895) demonstrated the existence of microorganisms, their role as ferments, and explained their action. His research led to improvements in industrial practices, including the selection of yeasts, molds, and other bacteria for their specific qualities. Although no transgenic bacteria is currently authorized in food in France, the scientific community recognizes that their use could solve many problems faced by the food industry during manufacturing processes.
The Laboratory of Microbial Biodiversity and Biotechnology (USR3579 - LBBM), a joint venture between Sorbonne Université and CNRS, is the main actor in this field. Its mission is to describe and explore microbial biodiversity, develop novel biotechnology products from environmental microorganisms, and provide services to meet the needs of industrial partners, environmental agencies, and other stakeholders.

b) COMMERCIAL PRODUCTION

Post has no information about the use of microbial biotechnology in the production of food products as there are no officially registered microbial biotech-derived products France at the time of report writing

c) EXPORTS

In 2022 French startup Gourmey has raised funding and started working cultivated meat and producing artificial foie gras using stem cells from fertilized duck eggs in fermenting tanks, significantly reducing emissions and reliance on animal products.[6] While currently only able to sell in Singapore, Gourmey is working with food safety authorities to gain approval in other regions such as EU.
French startup Vital Meat has submitted a dossier to food regulators in England and Scotland in 2024, for its cultivated chicken, a process that's expected to take 18 to 24 months.
Vital Meat, which uses pharmaceutical technology to transform cells from fertilized chicken eggs into cultivated meat, expects to receive regulatory clearance in Singapore by the end of the year.

d) IMPORTS

No official information concerning microbial biotechnology based products is available for imports.

e) TRADE BARRIERS

Public and governmental opposition limits the use of products obtained through any kind of biotechnology product(bacteria included)

[6] L'agriculture cellulaire - Agriculture Cellulaire France

PART H – POLICY

a) REGULATORY FRAMEWORK

France operates under the EU biotechnology regulatory framework. Several ministries oversee animal biotechnology and cloning, including the Ministry of Agriculture, Ministry of Ecology, Ministry of Research, and Ministry of Health. Senate's Economic Affairs Committee remains opposed to cellular foods, citing anthropological, ethical, cultural, and political concerns. The information mission on "in vitro meat" emphasized that while cellular foods show promise for the environment and animal welfare, they are not essential for the food transition and could impact livestock farming. The mission recommended strengthening food authorization procedures, improving consumer information and labeling, and prioritizing research on cellular foods alongside livestock farming and plant proteins to achieve protein autonomy[7].

b) APPROVALS

No national policy specific to microbial biotechnology.

c) LABELING AND TRACEABILITY

No national policy specific to microbial biotechnology.

d) INTELLECTUAL PROPERTY RIGHTS

French regulations align with the EU.

e) INTERNATIONAL TREATIES AND FORUMS

France aligns its position with the EU in international organizations such as the OECD, OIE, FAO, and Codex. Most biotechnology related trade barriers in France have their origins in EU regulation. There is no information on any additional biotechnology-related trade barriers that negatively affect U.S. exports of microbial biotech-derived food ingredients or processed food products containing microbial biotech-derived food ingredients.

[7] Aliments cellulaires : état des lieux et perspectives | Sénat

PART I – MARKETING

a) PUBLIC/PRIVATE OPINIONS

French public opinion is rather reluctant GE food products, but it seems that there is no public awareness on microbial biotechnology in France. Since GE microorganisms in France are generally contained and absent in the final consumption product, the French public may not be as averse to the use of this technology, except for the cellular food as the cultivated meat that generated multiple discussions.

b) MARKET ACCEPTANCE/STUDIES

There is no public awareness on microbial biotechnology in France

Attachments:

No Attachments