

Overview of the regulatory system for food and feed safety: USA

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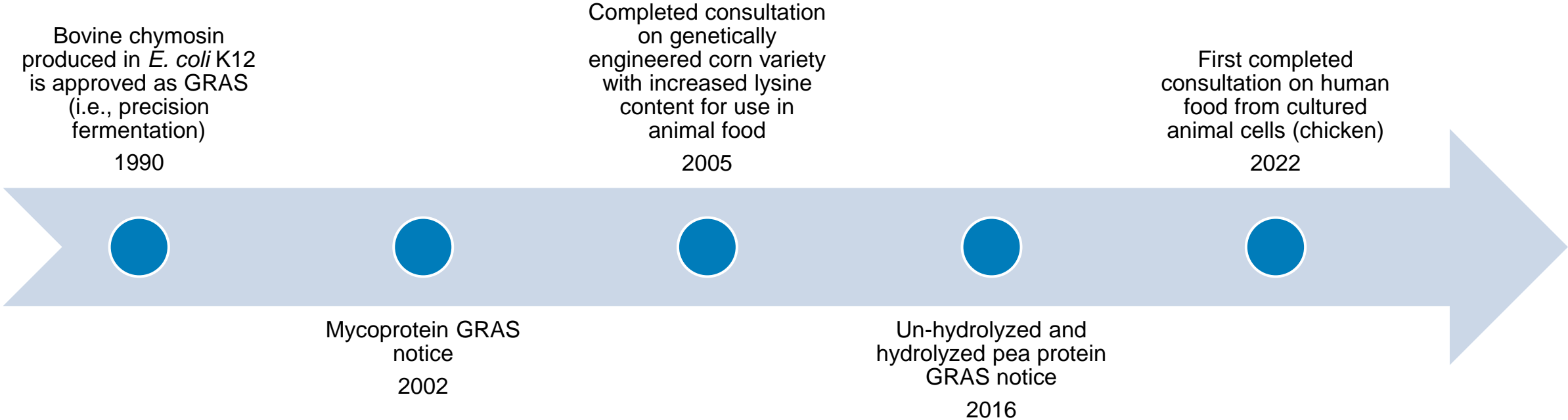
Alternative Proteins for Food and Feed International Conference

December 3, 2024 Berlin

FDA Supports Food Innovation

- Food innovation is accelerating faster than ever before
- Examples include:
 - Food ingredients from new sources,
 - Food ingredients produced using new methods (e.g., precision fermentation),
 - Cultured animal cell foods, and
 - Food from genetically engineered/genome edited plants.
- FDA has experience overseeing the food safety of these products

Selected Protein Products Evaluated in our Programs



Regulatory Framework



- We regulate foods using our existing regulatory authority under the Federal Food, Drug, and Cosmetic Act (FD&C Act)
 - FD&C Act provides broad authority to oversee the safety of food and substances added to food
 - Provides both premarket and post-market authorities
 - FD&C Act provides the flexibility to ensure a case-by-case assessment of food safety that considers the food and its intended use
 - For some products, coordination is needed with the Department of Agriculture's Food Safety and Inspection Service (FSIS)

Regulatory Programs for Substances Added to Food

- **Food ingredients**

- [Food additive](#) and [color additive](#) petition process
 - Results in a regulation in the Code of Federal Regulations allowing safe use
 - Separate processes for human food and animal food uses
 - Example: soy leghemoglobin that imparts color to ground beef analogue products (color additive)
- [Food contact substance notification program](#)
 - Results in an effective food contact substance notification
 - Example: glass-based pearlescent pigments for use in printing ink
- [Generally recognized as safe \(GRAS\) notice program](#)
 - Results in an agency response letter posted on our website
 - Separate processes for human food and animal food uses
 - Example: soy leghemoglobin to optimize flavor in ground beef analogue products, pea protein for use as a source of protein in food

Premarket Requirements



- **Food additives**

- Any substance reasonably expected to become a component of food is a food additive that is subject to premarket approval by FDA, unless the substance is generally recognized as safe (GRAS) among experts qualified by scientific training and experience to evaluate its safety under the conditions of its intended use, or meets one of the other exclusions from the food additive definition in section 201(s) of the Federal Food, Drug, and Cosmetic Act (FD&C Act)
- Whether a substance is a food additive or its use is GRAS, there must be reasonable certainty of no harm when used as intended

Premarket Requirements



- **Generally Recognized as Safe (GRAS)**

- Use of an ingredient can be GRAS based on (see 21 CFR 170.30):
 - Common use in food prior to 1958 (identical to the proposed use) or
 - Scientific procedures
- Use of a substance that is GRAS is distinguished from its regulation as a food additive by the type of information that supports the GRAS conclusion - i.e, that the food safety information is publicly available and generally accepted by the scientific community - but should be the same quantity and quality of information needed to obtain approval as a food additive

Premarket Requirements

• Color additives

- Color additives are distinguished from food additives
- A color additive is any dye, pigment or substance which when added or applied to a food, drug or cosmetic, or to the human body, is capable (alone or through reactions with other substances) of imparting color
 - GRAS does not apply to color additives
 - Same safety standard as foods additives - Reasonable certainty of no harm when used as intended

Post-market Requirements

- FD&C Act provides a broad range of post-market authorities that can be applied to foods generally
- For example...
 - Authority to take action against food that bears or contains any poisonous or deleterious substance which may render it injurious to health (e.g., chemical, microbial or physical hazards),
 - Hazard analysis and risk-based preventive controls,
 - Labeling, etc.

Post-market Requirements

- As part of its on-going compliance activities, FDA identifies foods that contain a substance for which there is no authorization as a food additive and then reviews the regulatory status of this substance.
 - [Post-market Determinations that the Use of a Substance is Not GRAS](#)
- [Development of an Enhanced Systematic Process for FDA's Post-Market Assessment of Chemicals in Food](#)
 - Public meeting, September 2024

Role of USDA



- The Department of Agriculture's Food Safety and Inspection Service (FSIS) ensures that meat, poultry and egg products are safe, wholesome and properly labeled
 - FDA coordinates with FSIS on the safety of substances added to meat, poultry and egg products
 - FDA and FSIS have a [formal agreement](#) to regulate cell-cultured food products from cell lines of livestock and poultry

Regulatory Programs for Whole Foods

• Whole foods

- In these programs we consider whether food would be unlawful taking into account both our premarket and post-market authority
 - [Voluntary Premarket consultation for foods from new plant varieties](#)
 - Results in an agency response letter posted on our website
 - Considers human food and animal food uses
 - Example: Golden Rice (rice expressing beta-carotene)
 - [Voluntary Premarket consultations for human food made with cultured animal cells](#)
 - Results in an agency response letter posted on our website
 - Considers the safety of the process used to produce the food, any inputs and the final product
 - Requires coordination with USDA/FSIS for meat, poultry and Siluriformes fish
 - Example: cultured chicken cell material
- As a component of these evaluations, FDA would consider whether any substance added to the food is an unapproved food or color additive

Transparency

- Transparency of the entire process is very important
 - Transparency to consumers
 - Transparency to food supply chains
 - Transparency to counterpart competent authorities
 - Foreign and domestic
- We maintain inventories of products that have participated in our programs so that our decisions and the bases for our decisions are clear



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GRN No. (sorted Z-A)	Substance	Date of closure	FDA's Letter
1116	Shea stearin		Pending
1115	Fungal oil (740% arachidonic acid (ARA)) from <i>Mortierella alpina</i> strain AF		Pending
1114	<i>Bifidobacterium breve</i> DSM 33444		Pending
1113	<i>Lactobacillus plantarum</i> NCIMB 30582		Pending
1112	<i>Limosilactobacillus reuteri</i> strain ATCC PTA-126787 and <i>L. reuteri</i> strain ATCC PTA-126788, in combination, on a 1:1 ratio of colony forming unit (CFU) basis		Pending
1111	Endo-1,4-β-xylanase enzyme preparation produced by <i>Bacillus subtilis</i> expressing the gene encoding xylanase from <i>B. subtilis</i>		Pending
1110	Polygalacturonase enzyme preparation produced by <i>Trichoderma reesei</i> expressing a gene encoding a polygalacturonase from <i>Aspergillus kawachii</i>		Pending
1109	β-agarase enzyme preparation produced by <i>Streptomyces coelicolor</i>		Pending
1108	<i>Lactiplantibacillus plantarum</i> strain MCC 0537		Pending
1107	<i>Bifidobacterium longum</i> subsp. <i>infantis</i> strain LMG 11588		Pending
1106	Rebaudioside I obtained by enzymatic treatment of steviol glycosides purified from the leaves of <i>Stevia rebaudiana</i> (Bertoni) Bertoni (rebaudioside I)		Pending
1105	Polyglycerol polyricinoleic acid		Pending
1104	Egg-white protein produced by <i>Komagataella phaffii</i> strain ATCC GSD-1235		Pending
1103	Canola protein isolate		Pending
1102	Invertase enzyme preparation produced by <i>Trichoderma reesei</i> expressing a gene for invertase from <i>Aspergillus niger</i>		Pending
1101	Dried biomass of <i>Chlamydomonas reinhardtii</i> strain TAI114		Pending

Inventory of GRAS Notices

Records Found: 201 Show All Page 1 of 5

BNF No	Food	Designation	Trait(s)	Developer*	Unique Identifier	Date Completed (sorted Z-A)
178	Tomato	<i>Del/Ros1-N</i>	Increased levels of anthocyanins in the fruit	Norfolk Plant Sciences	<i>Del/Ros1-N</i>	Jun 20, 2023
179	Corn	MON 95379	Insect resistance	Bayer CropScience LP	MON-95379-3	Dec 5, 2022
177	Canola	MON 94100	Herbicide tolerance (dicamba)	Bayer CropScience LP	MON-94100-2	Oct 4, 2022
175	Corn	DP23211	Insect resistance Herbicide tolerance (glufosinate ammonium)	Pioneer Hi-Bred International, Inc.	DP-023211-2	Jul 31, 2022
173	Corn	MON 87429	Herbicide tolerance (dicamba, glufosinate ammonium, aryloxyphenoxypropionate acetyl coenzyme A carboxylase inhibitors and 2,4-dichlorophenoxyacetic acid (2,4-D), and glyphosate) Male sterility (glyphosate-inducible)	Bayer CropScience LP	MON-87429-9	Jul 7, 2022
170	Wheat	HB4	Altered growth properties Herbicide tolerance (glufosinate ammonium)	Bioceres Inc.	IND-00412-7	Jun 22, 2022
172	Soybean	GMB151	Nematode resistance (plant-parasitic nematodes) Herbicide tolerance (HPPD-inhibitor)	BASF Corporation	BCS-GM151-6	Apr 27, 2022
165	Canola	LBFLFK	Change in composition (oil - production of certain long chain polyunsaturated fatty acids) Herbicide tolerance (imidazolinone herbicides)	BASF Plant Science, L.P.	BPS-BFLFK-2	Mar 25, 2022
162	Canola	NS-B50027-4	Change in composition (oil - production of certain long chain polyunsaturated fatty acids) Herbicide tolerance (glufosinate ammonium)	Nuseed Americas Inc.	NS-B50027-4	Mar 25, 2022
168	Corn	DBN9858	Herbicide tolerance (glyphosate) Herbicide tolerance (glufosinate ammonium)	Beijing DaBeiNong Biotechnology Co. Ltd. (DBNBC)	DBN-09858-5	Oct 21, 2021

New Plant Variety Consultations

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CCC No. (sorted A-Z)	Food	Species of origin	Sponsor	Date of FDA response
001	Cultured chicken cell material	<i>Gallus gallus</i>	GOOD Meat, Inc.	Mar 20, 2023
002	Cultured chicken cell material	<i>Gallus gallus</i>	UPSIDE Foods	Nov 16, 2022

Human Food Made with Cultured Animal Cells Inventory

Substances approved for use through food or color additive petitions can be seen in relevant sections of the Code of Federal Regulations.

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FCN No. (sorted Z-A)	Food Contact Substance	Manufacturer/Supplier	Effective Date
2283	2,5-dihydropyrrolo[3,4-c]pyrrole-1,4-dione, 3,6-bis[3-chloro-5-(octadecylthio)phenyl] and 4-chlorophenyl derivatives (CAS Reg. No. 2142611-43-4).	CINIC Chemicals America, LLC	May 23, 2023
2282	Pyrophyllite (CAS Reg. No. 12269-78-2).	Trinity Resources Ltd. Trinity Performance Minerals	May 20, 2023
2281	Butanoic acid, 3-hydroxy-, (3R)-, polymer with 4-hydroxybutanoic acid (CAS Reg. No. 125495-90-1), containing from 25 to 35 weight percent 4-hydroxybutanoic acid.	CJ CheilJedang Corporation	May 3, 2023
2278	2-Methyl-4,6-bis[(octylthio)methyl]phenol (CAS Reg. No. 110553-27-0).	BASF	Apr 13, 2023
2277	Benzenesulfonic acid, 2,2'-(1,2-ethenediyl)bis[5-(4-(bis(2-hydroxyethyl)amino)-6-(4-sulfophenyl)amino)-1,3,5-triazin-2-yl)amino]-, tetrasodium salt (CAS Reg. No. 16470-24-9).	Hebei Sanchuan Chemical Co., Ltd.	Apr 13, 2023
2276	2-Propenoic acid, 2-cyano-3-(3,4-dimethoxyphenyl)-, 1,1'-[2,4,8,10-tetraoxaspiro[5.5]undecane-3,9-diylo]bis(2,2-dimethyl-2,1-ethanediyl) ester, (2E,2'E)- (CAS Reg. No. 2233585-18-5).	Chittec Technology Co., Ltd.	Apr 8, 2023
2274	An aqueous mixture of peroxyacetic acid (PAA) (CAS Reg. No. 79-21-0), hydrogen peroxide (HP) (CAS Reg. No. 7722-84-1), acetic acid (CAS Reg. No. 64-19-7), optionally, sulfuric acid (CAS Reg. No. 7664-93-9), and optionally, 1-hydroxyethylidene-1,1-diphosphonic acid (HEDP) (CAS Reg. No. 2809-21-4) and/or optionally dipicolinic acid (DPA) (CAS Reg. No. 499-83-2). REPLACES FCNS 1872, 1897, and 2070	Hydrite Chemical Co.	Apr 7, 2023
2272	Poly[(butylene)succinate]-co-adipate] cross-linked with malic acid. REPLACES FCN 1818	PTT MCC Biochem Company Limited	Mar 3, 2023
2271	Poly(1,4-butylene glycol-co-succinic acid), cross-linked with malic acid. REPLACES FCN 1817	PTT MCC Biochem Company Limited	Mar 2, 2023
2270	2-[4,6-bis(2,4-dimethylphenyl)-1,3,5-triazin-2-yl]-5-(octyloxy)phenol (CAS Reg. No. 2725-22-6).	Rianlon Corporation	May 13, 2023

Inventory of Effective Food Contact Substance (FCS) Notifications

How FDA Supports Food Innovation

- FDA has historically supported innovation through early engagement with innovators on food safety and regulatory issues
 - Enables innovators to make informed business decisions
 - Enables FDA to better understand new products entering the market
- Early engagement between FDA and innovators can make for a more predictable regulatory path
 - Early engagement can be especially helpful to new firms entering the food space.

Getting Started



- For developers, an introductory meeting is good way to get started
 - What happens at an early engagement (pre-submission) meeting?
 - Last about an hour and are conducted virtually
 - Firms provide a description of their product or product concept
 - FDA responds with thoughts, suggestions and/or guidance based on the information presented
 - FDA may highlight outstanding safety or regulatory issues associated with the product or product concept
 - There are no fees, open to foreign and domestic firms
 - Certain information can be protected from public disclosure in accordance with the Freedom of Information Act

Getting Started



- How to get started?
 - Contact FDA to request a meeting or ask questions.
 - Ingredients: premarkt@fda.hhs.gov
 - Plant biotechnology: plantbiotech@fda.hhs.gov
 - Foods from animal cell culture: animalcellculturefoods@fda.hhs.gov
 - Other useful references
 - [Landing Page: Food Ingredients and Packaging](#)
 - [How to Start a Food Business](#)

The screenshot shows the FDA website page for "How to Start a Food Business". The page header includes the FDA logo and navigation links. The main content area features a title "How to Start a Food Business" with social sharing options (Share, Tweet, LinkedIn, Email, Print). Below the title, there is a sidebar with "Food Industry" and "How to Start a Food Business" links. The main text discusses regulatory requirements for starting a food business, mentioning "low-acid canned food, seafood, or juice". A right sidebar shows "Content current as of: 05/13/2021" and "Regulated Product(s): Food & Beverages".



Human Foods Program