

GENETICKY MODIFIKOVANÉ ORGANIZMY A JEJICH PRODUKTY NA TRHU POTRAVIN V ČR

a.

Souhrn

Rok 2011 byl desátým rokem, kdy probíhala studie "GENOMON" zaměřená na sledování výskytu příměsí geneticky modifikovaných organismů v potravinách v rámci monitoringu dietární expozice.

Ve čtyřech odběrových termínech byly na 12 místech v ČR odebrány v obchodní síti vzorky 4 druhů potravin, u nichž je pravděpodobnost použití surovin z geneticky modifikovaných organismů (GMO) nejvyšší. Celkem bylo v roce 2011 odebráno a analyzováno 192 vzorků (48 vzorků rýže, 48 vzorků sójových bobů, 48 vzorků sójových výrobků a 48 vzorků kukuřičné mouky). K detekci GMO a potravin nového typu byla využita kvalitativní screeningová a identifikační metoda polymerázové řetězové reakce (dále PCR).

Z celkového počtu 192 analyzovaných vzorků potravin na přítomnost DNA z GMO bylo vyhodnoceno jako GMO pozitivní 31 vzorků kukuřičné mouky, 14 vzorků rýže a jeden vzorek sojových bobů.

Ve vzorcích kukuřičné mouky byla identifikační metodou PCR prokázána přítomnost geneticky modifikované kukuřice linie MON810 (v 1 vzorku), NK603 (ve 3 vzorcích) a NK603 x MON810 (v 5 vzorcích), které jsou v EU povoleny k uvádění na trh. Ostatní pozitivní vzorky kukuřice s příměsí GM kukuřice nebyly došetřeny. V jednom vzorku sójového bobu byla prokázána přítomnost geneticky modifikované RoundupReady sóji. Získané výsledky jsou uvedeny v tabulce č. 1.

Tab. 1: Výskyt GMO v potravinách v roce 2010

Materiál	n	n+ (%)	n- (%)
Sójové boby	48	1 (2,1)	47 (97,9)
Sójové výrobky	48	0 (0,0)	48 (100,0)
Rýže	48	14 (29,2)	34 (70,8)
Mouka kukuřičná	48	31 (64,6)	17 (35,4)
Celkem	192	46 (24,0)	146 (76,0)

Kvalitativní PCR stanovení použité při analýzách dosahuje meze stanovitelnosti 0,1 % přítomnosti surovin z geneticky modifikovaného organismu. Od roku 2004 se nemusí značit produkty, které neobsahují více než 0,9 % příměsí GMO schválených pro uvedení do oběhu, pokud jsou tyto příměsí náhodné nebo z technického hlediska nevyhnutelné. Žádná z vyšetřených potravin nebyla označena ve smyslu obsahu GM surovin.

V průběhu monitorovacího roku nebyly publikovány žádné nové vědecké poznatky, které by označovaly zdravotní rizika vyplývající z použití potravin na bázi GMO.

b.

Spolupracující organizace a odborníci

Státní zdravotní ústav, Centrum zdraví, výživy a potravin v Brně (Doc. MVDr. Jiří Ruprich, CSc., Doc. MVDr. Vladimír Ostrý, CSc., Mgr. Monika Mendlová, Ivana Ciprová).

c.

Základní informace

Pojem genetická modifikace, tj. vnášení nových genů do genomu cílového organismu, umožňují zlepšení výnosů prostřednictvím jejich ochrany proti plevelům, nemocem a škůdcům a v budoucnu jistělepší i nutriční hodnotu potravin. Na trhu se objevují především geneticky modifikované organizmy (dále GMO), které zahrnují především zlepšení vlastností pro producenty. Nejčastějším znakem pěstovaných geneticky modifikovaných plodin je tolerance k herbicidům či odolnost vůči hmyzím škůdcům. V současné době vzrůstá zájem především o plodiny pro technické účely (např. výroba biopaliv, technického škrobu). V EU je dosud povolena ke komerčnímu pěstování kukuřice odolná proti zavíječi kukuřičnému, tzv. Bt kukuřice. V České republice se tato kukuřice pěstuje od roku 2005.

Veřejnost, především v zemích Evropy, se obává negativních dopadů využití moderních biotechnologií. Potencionální rizika je možno zařadit do dvou skupin: 1) vliv na zdraví lidí a zvířat a 2) možné důsledky pro životní prostředí (ohrožení biodiverzity při uvolňování živých modifikovaných organismů do prostředí). Proto veřejnost žádá důvěryhodné informace o vlastnostech, ale i šíření GMO na trhu s potravinami.

Rok 2011 byl desátým rokem studie "GENOMON", zaměřeným na sledování výskytu potravin, které byly vyrobeny z geneticky modifikovaných organismů. Ve studii, kterou lze chápat také, jako určitý stupeň nezávislého tzv. post-market monitoringu jsme se zaměřili na průkaz GMO a potravin vyrobených na bázi GMO nakoupených v tržní síti ČR, s cílem získat informace o frekvenci výskytu potravin vyrobených z GMO v ČR.

Analýza byla provedena u 192 individuálních vzorků potravin (4 vybrané druhy * 4 odběrové termíny * 16 odběrových míst v ČR), které byly svázeny ze čtyř regionů republiky (16 míst v republice, region A = Pelhřimov, České Budějovice, Plzeň, Strakonice, region B = Praha, Kolín, Jičín, Kladno, region C = Olomouc, Litomyšl, Frýdek-Místek, Litovel, region D = Brno, Zlín, Náměšť nad Oslavou, Uherské Hradiště).

Podle vyhlášky č. 113/2005 Sb. o označování potravin, ve znění pozdějších předpisů, musí být potravina, která je geneticky modifikovaným organismem nebo jej obsahuje, na obalu označena slovy "geneticky modifikováno" nebo "obsahuje geneticky modifikovaný organismus". Potravina vyrobená z geneticky modifikovaného organismu, která jej již neobsahuje a která není rovnocenná existující potravine, se označí slovy "vyrobena z geneticky modifikované (-ho)... "následovanými názvem použité suroviny. U jednosložkových potravin se slova "vyrobena z geneticky modifikované (-ho)..." uvedou zřetelně viditelná na etiketě. Nemusí se značit produkty, které neobsahují více než 0,9 % příměsí GMO schválených pro uvedení do oběhu, pokud jsou tyto příměsí náhodné nebo z technického hlediska nevyhnutelné (zákon 78/2004 Sb. v pozdějším znění a vyhláška 209/2004 Sb., nařízení Evropského parlamentu a rady č. 1829/2003, 1830/2003, 1946/2003). Žádná z vyšetřovaných potravin nebyla označena podle výše uvedeného schématu.

d.

Použitá metodika

Analýza GMO a potravin na bázi GMO byla provedena s využitím molekulárně biologických metod (polymerázové řetězové reakce-PCR) k detekci vneseného genetického materiálu do DNA hostitele.

Metoda PCR

PCR metody slouží pro diagnostiku specifických sekvencí DNA. Tato metoda umožňuje in vitro zmnožení vybraného úseku DNA, který se nachází mezi dvěma místy o známé sekvenci nukleotidů. Jako cílová sekvence může vystupovat veškerá vnesená DNA – tj. promotor, samotný gen, terminátor nebo genový marker, použitý pro selekci transgenických organismů. V našem případě byla pro detekci geneticky modifikovaných potravin a plodin využita screeningová a identifikační PCR metoda.

Zabezpečení kvality práce

Metody použité v pilotní studii „GENOMON“ byly validovány. Zkoušky byly akreditovány u Českého institutu pro akreditaci (ČIA) podle normy ČSN EN ISO/IEC 17025. Metody jsou zpracovány do formy *Standardních operačních postupů (SOP)*. Při práci jsou používány certifikované referenční materiály a laboratoř GMO se pravidelně účastní mezinárodních mezilaboratorních porovnávacích zkoušek (GeMMA).

Strategie analytického postupu

Pro analýzu byly vybrány potraviny, které podle mezinárodních přehledů připadají nejčastěji v úvahu z hlediska obsahu DNA pocházejících z GMO. Jedná se především o rýži, sóju a sójové výrobky, kukuřici a kukuřičné výrobky. Vzorky rýže byly vyšetřeny pomocí screeningové PCR, zaměřené na obecně se vyskytující nové geny ve více typech GMO (35S, NOS) a identifikační PCR metody pro detekci rýže Bt63. Vzorky potravin na bázi sóji byly vyšetřeny pomocí identifikační PCR zaměřené na specifický typ GMO (RoundupReady sója). Vzorky kukuřičné mouky byly vyšetřeny pomocí identifikační metody PCR zaměřené na specifický typ GMO (MON810, Bt176, Bt11, T25, NK603, Bt10, GA21, StarLink, MON88017/89034). Tento analytický postup umožňuje záchyt v ČR/EU povolených GMO, ale s jistou pravděpodobností i dalších. Identifikační PCR stanovení pak umožňuje odlišení povolených a nepovolených produktů (RR sója, určité typy kukuřice). Tabulka č. 2 shrnuje použitou strategii analytického postupu. V příloze č. 1 této kapitoly je seznam GMO dle dostupných mezinárodních údajů (databáze AGBIOS), které přicházejí u jednotlivých druhů v úvahu z hlediska výskytu na trhu s potravinami.

Tab. 2: Použitá strategie analytického postupu.

Typ vzorku	Screeningová PCR (gen)	Identifikační PCR (DNK, primer)
Sójové boby	35S, NOS	RR sója (35S-f2, petu-r1)
Sójové výrobky	35S, NOS	RR sója (35S-f2, petu-r1)
Kukuřičná mouka	35S, NOS	<ul style="list-style-type: none"> • BT11 (IVS2-2, PAT-B) • BT176 (Cry03, Cry04) • T25 (T25-F7, T25-R3) • MON810 (VW01, VW03) • NK603 (NK603-1, NK603-2) • Bt10 (JSF5, JSR5) • GA21(Ga21 1–5, Ga21 1–3) • StarLink (CBH02, CM03) • MON88017 • MON89034
Rýže	35S, NOS	<ul style="list-style-type: none"> • Bt63

e.

Výsledky laboratorní analýzy

Z celkového počtu 192 analyzovaných vzorků potravin na přítomnost DNA z GMO bylo vyhodnoceno jako GMO pozitivní 31 vzorků kukuřičné mouky, 14 vzorků rýže a jeden vzorek sojových bobů..

Ve vzorcích kukuřičné mouky byla prokázána identifikační metodou PCR přítomnost geneticky modifikované kukuřice linie MON810 (v 1 vzorku), NK603 (ve 3 vzorcích) a NK603 x MON810 (v 5 vzorcích), které jsou v EU povoleny k uvádění na trh. Ostatní pozitivní vzorky kukuřice s příměsí GM kukuřice nebyly došetřeny. Ve vzorku sójových bobů byla prokázána přítomnost geneticky modifikované Roundup Ready sóji.

f. **Závěr**

Při hodnocení výsledků studie je nutné vzít v potaz současné technické možnosti. Kvalitativní PCR stanovení použité při analýzách dosahuje meze stanovitelnosti 0.1% přítomnosti surovin z geneticky modifikovaného organismu. Značení výrobků je povinné od 0,9%. V průběhu roku 2010 nebyly publikovány žádné nové aktuální vědecké údaje, které by popisovaly zdravotní rizika z použití potravin na bázi GMO.

V ČR je povoleno uvádět do oběhu ty potraviny na bázi GMO, které jsou povoleny v EU, viz. příloha č. 2 (zdroj: : http://ec.europa.eu/food/dyna/gm_register/index_en.cfm)

Výsledky potvrzují, že se v obchodní síti v ČR vyskytují i potraviny obsahující geneticky modifikované organismy (kukuřice MON810, NK603 a NK603 x MON810, GM rýže a RR sojové boby). Na trhu se začínají více vyskytovat potraviny, které obsahují nepovolené GMO (rýže).

Příloha č.1

Přehled odrůd rostlin připravených pomocí rekombinantních technologií (GMO) a odrůd spadajících do kategorie „nového typu“, ale získaných „tradičními“ metodami šlechtění, které jsou vedeny v mezinárodně dostupné databázi AGBIOS (<http://www.agbios.com/>).

Počet	ID	Firma	Molekulární diagnostika*	Popis GMO
Sója				
1	A2704-12, A2704-21, A5547-35	Aventis CropScience	35S	Glufosinate ammonium herbicide tolerant soybean produced by inserting a modified phosphinothricin acetyltransferase (PAT) encoding gene from the soil bacterium <i>Streptomyces viridochromogenes</i> .
2	A5547-127	Bayer CropScience (Aventis CropScience(AgrEvo))	35S	Glufosinate ammonium herbicide tolerant soybean produced by inserting a modified phosphinothricin acetyltransferase (PAT) encoding gene from the soil bacterium <i>Streptomyces viridochromogenes</i> .
3	G94-1, G94-19, G168	DuPont Canada Agricultural Products	35S, NOS	High oleic acid soybean produced by inserting a second copy of the fatty acid desaturase (GmFad2-1) encoding gene from soybean, which resulted in "silencing" of the endogenous host gene.
4	GTS 40-3-2	Monsanto Company	35S, NOS, RRS-HT-P/C, EPSPS real time PCR	Glyphosate tolerant soybean variety produced by inserting a modified 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) encoding gene from the soil bacterium <i>Agrobacterium tumefaciens</i> .
5	GU262	Bayer CropScience (Aventis CropScience(AgrEvo))	35S	Glufosinate ammonium herbicide tolerant soybean produced by inserting a modified phosphinothricin acetyltransferase (PAT) encoding gene from the soil bacterium <i>Streptomyces viridochromogenes</i> .
6	OT96-15	Agriculture & Agri-Food Canada		Low linolenic acid soybean produced through traditional cross-breeding to incorporate the novel trait from a naturally occurring <i>fan1</i> gene mutant that was selected for low linolenic acid.
7	W62, W98	Bayer CropScience (Aventis CropScience(AgrEvo))	35S	Glufosinate ammonium herbicide tolerant soybean produced by inserting a modified phosphinothricin acetyltransferase (PAT) encoding gene from the soil bacterium <i>Streptomyces hygroscopicus</i> .
Kukuřice				
1	I76	Syngenta Seeds, Inc.	35S, BT176-IR1-P/G, Cry1Ab, real time PCR	Insect-resistant maize produced by inserting the <i>cry1Ab</i> gene from <i>Bacillus thuringiensis</i> subsp. <i>Kurstaki</i> . The genetic modification affords resistance to attack by the European corn borer (ECB).
2	3751IR	Pioneer Hi-Bred International Inc.		Selection of somaclonal variants by culture of embryos on imidazolinone containing media.
3	676, 678, 680	Pioneer Hi-Bred International Inc.		Male-sterile and glufosinate ammonium herbicide tolerant maize produced by inserting genes encoding DNA adenine methylase and phosphinothricin acetyltransferase (PAT) from <i>Escherichia coli</i> and <i>Streptomyces viridochromogenes</i> , respectively.
4	B16 (DLL25)	Dekalb Genetics Corporation	35S,	Glufosinate ammonium herbicide tolerant maize produced by inserting the gene encoding phosphinothricin acetyltransferase (PAT) from <i>Streptomyces hygroscopicus</i> .
5	BT11 (X4334CBR, X4734CBR)	Syngenta Seeds, Inc.	35S, NOS, Cry1Ab, real time PCR	Insect-resistant and herbicide tolerant maize produced by inserting the <i>cry1Ab</i> gene from <i>Bacillus thuringiensis</i> subsp. <i>Kurstaki</i> , and the phosphinothricin N-acetyltransferase (PAT) encoding gene from <i>S. viridochromogenes</i> .
6	CBH-351	Aventis CropScience	Cry9C, 35S, NOS	Insect-resistant and glufosinate ammonium herbicide tolerant maize developed by inserting genes encoding Cry9C protein from <i>Bacillus thuringiensis</i> subsp. <i>tolworthi</i> and phosphinothricin acetyltransferase (PAT) from <i>Streptomyces hygroscopicus</i> .
7	DBT418	Dekalb Genetics Corporation		Insect-resistant and glufosinate ammonium herbicide tolerant maize developed by inserting genes encoding Cry1AC protein from <i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i> and phosphinothricin acetyltransferase (PAT) from <i>Streptomyces hygroscopicus</i> .
8	DK404SR	BASF Inc.		Somaclonal variants with a modified acetyl-CoA-carboxylase (ACCase) were selected by culture of embryos on sethoxydim enriched medium.

9	EXP1910IT	Syngenta Seeds, Inc. (formerly Zeneca Seeds)		Tolerance to the imidazolinone herbicide, imazethapyr, induced by chemical mutagenesis of the acetolactate synthase (ALS) enzyme using ethyl methanesulfonate (EMS).
10	GA21	Monsanto Company	NOS	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS), an enzyme involved in the shikimate biochemical pathway for the production of the aromatic amino acids.
11	IT	Pioneer Hi-Bred International Inc.		Tolerance to the imidazolinone herbicide, imazethapyr, was obtained by in vitro selection of somaclonal variants.
12	MON80100	Monsanto Company		Insect-resistant maize produced by inserting the cry1Ab gene from <i>Bacillus thuringiensis</i> subsp. <i>Kurstaki</i> . The genetic modification affords resistance to attack by the European corn borer (ECB).
13	MON802	Monsanto Company		Insect-resistant and glyphosate herbicide tolerant maize produced by inserting the genes encoding the Cry1Ab protein from <i>Bacillus thuringiensis</i> and the 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) from <i>A. tumefaciens</i> strain CP4.
14	MON809	Pioneer Hi-Bred International Inc.	35S, NOS, EPSPS	Resistance to European corn borer (<i>Ostrinia nubilalis</i>) by introduction of a synthetic cry1Ab gene. Glyphosate resistance via introduction of the bacterial version of a plant enzyme, 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS).
15	MON810 YieldGuard	Monsanto Company	35S, Cry1Ab	Insect-resistant maize produced by inserting a truncated form of the cry1Ab gene from <i>Bacillus thuringiensis</i> subsp. <i>Kurstaki</i> HD-1. The genetic modification affords resistance to attack by the European corn borer (ECB).
16	MON832	Monsanto Company	35S, NOS	Introduction, by particle bombardment, of glyphosate oxidase (GOX) and a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS), an enzyme involved in the shikimate biochemical pathway for the production of the aromatic amino acids.
17	MON863	Monsanto Company	35S, Cry3Bb1 gene, nptII gene	Corn root worm resistant maize produced by inserting the cry3Bb1 gene from <i>Bacillus thuringiensis</i> subsp. <i>Kumamotoensis</i> .
18	MS3	Bayer CropScience (Aventis CropScience(AgrEvo))		Male sterility caused by expression of the barnase ribonuclease gene from <i>Bacillus amyloliquefaciens</i> ; PPT resistance was via PPT-acetyltransferase (PAT).
19	MS6	Bayer CropScience (Aventis CropScience(AgrEvo))		Male sterility caused by expression of the barnase ribonuclease gene from <i>Bacillus amyloliquefaciens</i> ; PPT resistance was via PPT-acetyltransferase (PAT).
20	NK603	Monsanto Company	EPSPS, NK603, 35S, NOS	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS), an enzyme involved in the shikimate biochemical pathway for the production of the aromatic amino acids.
21	T14, T25	Bayer CropScience (Aventis CropScience(AgrEvo))	35S, T25	Glufosinate herbicide tolerant maize produced by inserting the phosphinothricin N-acetyltransferase (PAT) encoding gene from the aerobic actinomycete <i>Streptomyces viridochromogenes</i> .
22	TC1507	Mycogen (c/o Dow AgroSciences); Pioneer (c/o DuPont)	35S, Cry1Fa2	Insect-resistant and glufosinate ammonium herbicide tolerant maize produced by inserting the cry1F gene from <i>Bacillus thuringiensis</i> var. <i>aizawai</i> and the phosphinothricin N-acetyltransferase encoding gene from <i>Streptomyces viridochromogenes</i> .
Rýže				
1	LLRICE601	Bayer CropScience (Aventis CropScience(AgrEvo))	35S, NOS, <i>bar</i>	<i>Agrobacterium tumefaciens</i> -mediated plant transformation. Phosphinothricin (PPT) herbicide tolerance, specifically glufosinate ammonium.
2	LLRICE06, LLRICE62	Aventis CropScience	35S, <i>bar</i>	Direct DNA transfer system. Phosphinothricin (PPT) herbicide tolerance, specifically glufosinate ammonium.
3	Bt63	China	Cry1Ab, Cry1Ac	Resistance to lepidopteran pests through the introduction of the cry1Ab and cry1Ac gene from <i>Bacillus thuringiensis</i>

* Použitá data doplněna z více publikačních zdrojů.

Příloha č. 2

EU register of genetically modified food and feed

Genetically modified cotton			
Transformation event/ <u>Unique ID</u>/ Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
Cotton (MON1445) <u>MON-01445-2</u> Monsanto	Genetically modified cotton that contains: cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate	Food produced from MON1445 cotton (cottonseed oil)	18/12/2011
		Food additives produced from MON1445 cotton	Renewal of authorisation ongoing
		Feed produced from MON1445 cotton (feed materials and feed additives)	Renewal of authorisation ongoing
Cotton (MON15985) <u>MON-15985-7</u> Monsanto	Genetically modified cotton that contains: cry1Ac and cry2Ab2 genes inserted to confer insect-resistance highly selective in controlling Lepidopteran insects	Food additives produced from MON-15985-7 cotton	Renewal of authorisation ongoing
		Feed produced from MON 15985 cotton (feed materials and feed additives)	Renewal of authorisation ongoing
Cotton (MON15985 x MON1445) <u>MON-15985-7 x MON-01445-2</u> Monsanto	Genetically modified cotton that contains: cry1Ac and cry2Ab2 genes inserted to confer insect-resistance highly selective in controlling Lepidopteran insects cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate	Food additives produced from MON15985 x MON1445 cotton	Renewal of authorisation ongoing
		Feed produced from MON15985 x MON1445 cotton (feed materials and feed additives)	Renewal of authorisation ongoing
Cotton (MON531) <u>MON-00531-6</u> Monsanto	Genetically modified cotton that contains: cry1A(c) gene inserted to confer insect-resistance	Food produced from MON 531 cotton (cottonseed oil)	18/12/2011
		Food produced from MON 531 cotton (food additives)	Renewal of authorisation ongoing
		Feed produced from MON 531 cotton (feed materials and feed additives)	Renewal of authorisation ongoing
Cotton (MON531 x MON1445) <u>MON-00531-6 x MON-01445-2</u> Monsanto	Genetically modified cotton that contains: cry1A(c) gene inserted to confer insect-resistance cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate	Food additives produced from MON531 x MON1445 cotton	Renewal of authorisation ongoing
		Feed produced from MON 531 x MON 1445 cotton (feed materials and feed additives)	Renewal of authorisation ongoing
Cotton (LLCotton25) <u>ACS-GH001-3</u> Bayer	Genetically modified cotton that contains: pat gene inserted to confer tolerance to the glyphosinate-ammonium herbicide	Foods and food ingredients containing, consisting of, or produced from ACS-GH001-3 cotton (including food additives)	28/10/2018
		Feed containing, consisting of, or produced from ACS-ACS-GH001-3 cotton (feed materials and feed additives)	
		Products other than food and feed containing or consisting of ACS-GH001-3 cotton for the same uses as any other cotton with the exception of cultivation	

Genetically modified maize			
Transformation event/ Unique ID/ Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
Maize (Bt11) SYN BT 011-1 Syngenta	Genetically modified maize that contains: cryIA (b) gene inserted to confer insect-resistance pat gene inserted to confer tolerance to the herbicide glufosinate-ammonium	Foods and food ingredients containing, consisting of, or produced from SYN-BT011-1xMON-00021-9	27/07/2020
		Feed containing, consisting of, or produced from SYN-BT011-1xMON-00021-9	
		Products other than food and feed containing or consisting of SYN-BT011-1xMON-00021-9	
Maize (DAS1507) DAS-01507-1 Pioneer and DowAgroSciences	Genetically modified maize that contains: cry1F gene inserted to confer resistance to the European corn borer and certain other lepidopteran pests pat gene inserted to confer tolerance to the herbicide glufosinate-ammonium	Foods and food ingredients containing, consisting or produced from DAS1507 maize (including food additives)	02/03/2016
		Feed produced from DAS1507 maize (feed materials and feed additives)	15/03/2016
		Feed produced from DAS1507 maize (feed materials and feed additives)	Renewal of authorisation ongoing
		Other products containing or consisting of DAS1507 with the exception of cultivation	15/03/2016
Maize (GA21) MON-00021-9 Monsanto	Genetically modified maize that contains: epsps gene inserted to confer tolerance to herbicide glyphosate	Foods and food ingredients containing, consisting of, or produced from MON-00021-9 maize (including food additives)	27/03/2018
		Feed containing, consisting of, or produced from MON-00021-9 maize (feed materials and feed additives)	
		Products other than food and feed containing or consisting of MON-00021-9 maize for the same uses as any other maize with the exception of cultivation	
Maize (MON810) MON-00810-6 Monsanto	Genetically modified maize that contains: cryIA (b) gene inserted to confer resistance to lepidopteran pests	Foods and food ingredients produced from MON810 (including food additives)	Renewal of authorisation ongoing
		Feed containing or consisting of MON810 maize	Renewal of authorisation ongoing
		Feed produced from MON810 maize (feed materials feed additives)	Renewal of authorisation ongoing
		<u>Seeds for cultivation</u>	Renewal of authorisation ongoing
Maize (MON863) MON-00863-5 Monsanto	Genetically modified maize that contains: a trait gene cry3Bb1 inserted to confer insect- resistance nptII gene inserted as a selection marker	Food containing, consisting of, or produced from MON 863 maize	12/01/2016
		Food additives produced from MON 863 maize	Renewal of authorisation ongoing
		Feed containing or consisting of MON 863 maize	12/02/2016
		Feed produced from MON 863 maize (feed materials and feed additives)	Renewal of authorisation ongoing
		Other products containing or consisting of MON863 with the exception of cultivation	12/02/2016

<p>Maize (MON863 x NK603) <u>MON-00863-5 x MON-00603-6</u></p> <p>Monsanto</p>	<p>Genetically modified maize that contains:</p> <p>cry3Bb1 gene inserted to confer protection against certain coleopteran pests</p> <p>cp4 epsps gene inserted to confer tolerance to glyphosate herbicides</p> <p>nptII gene inserted as a selection marker</p>	Foods and food ingredients containing, consisting of, or produced from MON-00863-5xMON-00603-6 maize	01/03/2020
		Feed containing, consisting of, or produced from MON-00863-5xMON-00603-6 maize)	
		Products other than food and feed, containing or consisting of MON-00863-5xMON-00603-6 maize for the same uses as any other maize with the exception of cultivation	
<p>Maize (MON863 x MON810) <u>MON-00863-5 x MON-00810-6</u></p> <p>Monsanto</p>	<p>Genetically modified maize that contains:</p> <p>cry3Bb1 gene inserted to confer protection against certain coleopteran pests</p> <p>cry1Ab gene inserted to confer protection against certain lepidopteran insect pests</p> <p>nptII gene inserted as a selection marker</p>	Foods and food ingredients containing, consisting of, or produced from MON-00863-5xMON-00810-6 maize	01/03/2020
		Feed containing, consisting of, or produced from MON-00863-5xMON-00810-6 maize	
		Products other than food and feed, containing or consisting of MON-00863-5xMON-00810-6 maize for the same uses as any other maize with the exception of cultivation	
<p>Maize (NK603) <u>MON-00603-6</u></p> <p>Monsanto</p>	<p>Genetically modified maize that contains:</p> <p>cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate</p>	Food containing, consisting of, or produced from NK603 maize	02/03/2015
		Food additives produced from NK603 maize	Renewal of authorisation ongoing
		Feed containing or consisting of NK603 maize	17/10/2014
		Feed produced from NK603 maize (feed materials and feed additives)	Renewal of authorisation ongoing
		Other products containing or consisting of NK603 with the exception of cultivation	17/10/2014
<p>Maize (NK603 x MON810) <u>MON-00603-6 x MON-00810-6</u></p> <p>Monsanto</p>	<p>Genetically modified maize that contains:</p> <p>cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate; cryIA (b) gene inserted to confer resistance to lepidopteran pests</p>	Foods and food ingredients containing, consisting of, or produced from MON-00603-6xMON-00810-6 maize (including food additives)	23/10/2017
		Feed containing, consisting of, or produced from MON-00603-6xMON-00810-6 maize (feed materials and feed additives)	23/10/2017
		Products other than food and feed containing or consisting of MON-00603-6xMON-00810-6 maize for the same uses as any other maize with the exception of cultivation	
<p>Maize (T25) <u>ACS-ZM003-2</u></p> <p>Bayer</p>	<p>Genetically modified maize that contains:</p> <p>pat gene inserted to confer tolerance to the herbicide glufosinate-ammonium</p>	Food and food ingredients produced from T25 maize	Renewal of authorisation ongoing
		Feed containing, consisting of, or produced from T25 maize (feed materials and feed additives)	Renewal of authorisation ongoing
		Seeds for cultivation	Renewal of authorisation ongoing
<p>Maize (DAS1507xNK603) <u>DAS-01507-1xMON-00603-6</u></p>	<p>Genetically modified maize that expresses:</p> <p>the Cry1F protein which confers protection against certain</p>	Foods and food ingredients containing, consisting of, or produced from DAS-01507-1xMON-00603-6 maize (including food additives)	23/10/2017

<p>Pioneer and Dow AgroSciences</p>	<p>lepidopteran pests such as the European corn borer (<i>Ostrinia nubilalis</i>) and species belonging to the genus <i>Sesamia</i>, the PAT protein which confers tolerance to the glufosinate-ammonium herbicide the CP4 EPSPS protein which confers tolerance to the glyphosate herbicide</p>	<p>Feed containing, consisting of, or produced from DAS-Ø15Ø7-1xMON-ØØ6Ø3-6 maize (feed materials and feed additives)</p> <p>Products, other than food and feed, containing or consisting of DAS-Ø15Ø7-1xMON-ØØ6Ø3-6 maize for the same uses as any other maize with the exception of cultivation</p>	
<p>Maize (MON88017) MON-88Ø17-3 Monsanto</p>	<p>Genetically modified maize that contains: modified cry3Bb1 gene inserted to confer protection to certain coleopteran pests and cp4 epsps gene inserted to confer tolerance to glyphosate herbicides</p>	<p>Foods and food ingredients containing, consisting of, or produced from MON-88Ø17-3 maize (including food additives)</p> <p>Feed containing, consisting of, or produced from MON-88Ø17-3 maize (feed materials and feed additives)</p> <p>Products other than food and feed containing or consisting of MON-88Ø17-3 maize for the same uses as any other maize with the exception of cultivation</p>	<p>29/10/2019</p>
<p>Maize (MON89034) MON-89Ø34-3 Monsanto</p>	<p>Genetically modified maize that contains: cry1A.105 and cry2Ab2 genes inserted to confer protection to certain lepidopteran pests</p>	<p>Foods and food ingredients containing, consisting of, or produced from MON-89Ø34-3 maize (including food additives)</p> <p>Feed containing, consisting of, or produced from MON-89Ø34-3 maize (feed materials and feed additives)</p> <p>Products other than food and feed containing or consisting of MON-89Ø34-3 maize for the same uses as any other maize with the exception of cultivation</p>	<p>29/10/2019</p>
<p>Maize (59122xNK603) DAS-59122-7xMON-ØØ6Ø3-6 Pioneer</p>	<p>Genetically modified maize that contains: cry34Ab1 and cry35Ab1 genes inserted to confer protection against certain coleopteran pests pat genes inserted to confer tolerance to the glufosinate-ammonium herbicides cp4 epsps genes inserted to confer tolerance to glyphosate herbicides</p>	<p>Foods and food ingredients containing, consisting of, or produced from DAS-59122-7xMON-ØØ6Ø3-6 maize (including food additives)</p> <p>Feed containing, consisting of, or produced from DAS-59122-7xMON-ØØ6Ø3-6 maize (feed materials and feed additives)</p> <p>Products other than food and feed containing or consisting of DAS-59122-7xMON-ØØ6Ø3-6 maize for the same uses as any other maize with the exception of cultivation</p>	<p>29/10/2019</p>
<p>Maize (MIR604) SYN-IR6Ø4-5 Syngenta</p>	<p>Genetically modified maize that contains: modified cry3A gene inserted to confer protection against certain coleopteran pests pmi gene inserted as selection marker</p>	<p>Foods and food ingredients containing, consisting of, or produced from SYN-IR6Ø4-5 maize (including food additives)</p> <p>Feed containing, consisting of, or produced from SYN-IR6Ø4-5 maize (feed materials and feed additives)</p> <p>Products other than food and feed containing or consisting of SYN-IR6Ø4-5 maize for the same uses as any other maize with the exception of cultivation</p>	<p>29/11/2019</p>
<p>Maize (DAS59122) DAS-59122-7 Pioneer and Dow AgroSciences</p>	<p>Genetically modified maize that contains: the cry34Ab1 and cry35Ab1 genes inserted to confer protection against certain coleopteran pests such as corn rootworm larvae (<i>Diabrotica</i></p>	<p>Foods and food ingredients containing, consisting of, or produced from DAS-59122-7 maize (including food additives)</p> <p>Feed containing, consisting of, or produced from DAS-59122-7 maize (feed materials and feed additives)</p>	<p>23/10/2017</p>

	spp.) pat gene inserted to confer tolerance to the glufosinate-ammonium herbicide	Products other than food and feed containing or consisting of DAS-59122-7 maize for the same uses as any other maize with the exception of cultivation	
Maize (MON863xMON810xNK603) <u>MON-00863-5xMON-00810-6xMON-00603-6</u> Monsanto	Genetically modified maize that contains: cry3Bb1 gene inserted to confer protection against certain coleopteran pests cry1Ab gene inserted to confer protection against certain lepidopteran insect pests cp4 epsps gene inserted to confer tolerance to glyphosate herbicides nptII gene inserted as a selection marker	Foods and food ingredients containing, consisting of, or produced from MON-00863-5xMON-00810-6xMON-00603-6 maize Feed containing, consisting of, or produced from MON-00863-5xMON-00810-6xMON-00603-6 maize Products other than food and feed, containing or consisting of MON-00863-5xMON-00810-6xMON-00603-6 maize for the same uses as any other maize with the exception of cultivation	01/3/2020
Maize (Bt11xGA21) <u>SYN-BT011-1xMON-00021-9</u> Syngenta	Genetically modified maize that expresses: the cry1Ab gene which confers protection against certain lepidopteran pests the pat gene which confers tolerance to the glufosinate-ammonium herbicides the mepsps gene which confers tolerance to glyphosate herbicides	Foods and food ingredients containing, consisting of, or produced from SYN-BT011-1xMON-00021-9 Feed containing, consisting of, or produced from SYN-BT011-1xMON-00021-9 Products other than food and feed containing or consisting of SYN-BT011-1xMON-00021-9	27/07/2020
Maize (MON88017xMON810) <u>MON-88017-3xMON-00810-6</u> Monsanto	Genetically modified maize that expresses: the cry1Ab gene which confers protection against certain lepidopteran pests the cry3Bb1 gene which provides protection to certain coleopteran pests the cp4 epsps gene which confers tolerance to glyphosate herbicides	Foods and food ingredients containing, consisting of, or produced from MON-88017-3xMON-00810-6 Feed containing, consisting of, or produced from MON-88017-3xMON-00810-6 Products other than food and feed containing or consisting of MON-88017-3xMON-00810-6	27/07/2020
Maize (MON89034 xNK603) <u>MON-89034-3x MON-00603-6</u> Monsanto	Genetically modified maize that expresses: the cry1A.105 and cry2Ab2 genes which provide protection to certain lepidopteran pests the cp4 epsps gene which confers tolerance to glyphosate herbicides	Foods and food ingredients containing, consisting of, or produced from MON-89034-3x MON-00603-6 Feed containing, consisting of, or produced from MON-89034-3x MON-00603-6 Products other than food and feed containing or consisting of MON-89034-3x MON-00603-6	27/07/2020
Maize (59122x1507xNK603) <u>DAS-59122-7xDAS-01507xMON-00603-6</u> Pioneer	Genetically modified maize that expresses: the cry1F gene which confers protection against certain lepidopteran pests	Foods and food ingredients containing, consisting of, or produced from DAS-59122-7xDAS-01507xMON-00603-6	27/07/2020

	<p>the cry34Ab1 and cry35Ab1 genes which provide protection to certain coleopteran pests</p> <p>the pat gene which confers tolerance to the glufosinate-ammonium herbicides</p> <p>the cp4 epsps gene which confers tolerance to glyphosate herbicides</p>	<p>Feed containing, consisting of, or produced from DAS-59122-7xDAS-Ø15Ø7xMON-ØØ6Ø3-6</p> <p>Products other than food and feed containing or consisting of DAS-59122-7xDAS-Ø15Ø7xMON-ØØ6Ø3-6</p>	
<p>Maize (1507x59122)</p> <p><u>DAS-Ø15Ø7x DAS-59122-7</u></p> <p>Pioneer</p>	<p>Genetically modified maize that expresses:</p> <p>the cry1F gene which confers protection against certain lepidopteran pests</p> <p>the cry34Ab1 and cry35Ab1 genes which provide protection to certain coleopteran pests</p> <p>the pat gene which confers tolerance to the glufosinate-ammonium herbicides</p>	<p>Foods and food ingredients containing, consisting of, or produced from DAS-Ø15Ø7x DAS-59122-7</p> <p>Feed containing, consisting of, or produced from DAS-Ø15Ø7x DAS-59122-7</p> <p>Products other than food and feed containing or consisting of DAS-Ø15Ø7x DAS-59122-7</p>	<p>27/07/2020</p>

Genetically modified oilseed rape			
Transformation event/ Unique ID / Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
<p>Oilseed rape (GT73)</p> <p><u>MON-ØØØ73-7</u></p> <p>Monsanto</p>	<p>Genetically modified oilseed rape that contains:</p> <p>cp4 epsps and goxv247 genes inserted to confer tolerance to the herbicide glyphosate</p>	Food produced from GT73 oilseed rape (refined oil and food additives)	Renewal of authorisation ongoing
		Feed containing and consisting of GT73 oilseed rape	20/02/2017
		Feed produced from GT73 oilseed rape (feed materials and feed additives)	Renewal of authorisation ongoing
		Other products containing or consisting of GT73 with the exception of cultivation	20/02/2017
<p>Swede-rape (MS8, RF3, MS8xRF3)</p> <p><u>ACS-BNØØ5-8</u> <u>ACS-BNØØ3-6</u> <u>ACS-BNØØ5-8 x ACS-BNØØ3-6</u></p> <p>Bayer</p>	<p>Genetically modified oilseed rape that contains:</p> <p>a bar (pat) gene inserted to confer tolerance to herbicides based on glufosinate amonium</p> <p>barnase gene inserted to leads to lack of viable pollen and male sterility</p> <p>barstar gene inserted to leads to lack of viable pollen and male sterility</p>	Food produced from MS8, RF3, MS8 x RF3 swede-rape (processed oil)	Renewal of authorisation ongoing
		Feed containing or consisting of MS8, RF3, MS8 x RF3 swede-rape	24/05/2017
		Feed produced from MS8, RF3, MS8 x RF3 swede-	Renewal of authorisation ongoing

		rape	
		Other products containing or consisting of MS8, RF3, MS8 x RF3 swede-rape with the exception of cultivation	24/05/2017
Oilseed rape (T45) <u>ACS-BN008-2</u> Bayer	Genetically modified oilseed rape that contains: pat gene inserted to confer tolerance to the herbicide glufosinate-ammonium	Foods and food ingredients containing or produced from ACS-BN008-2 oilseed rape (including food additives)	09/03/2019
		Feed containing or produced from ACS-BN008-2 oilseed rape (feed materials and feed additives)	
		Products other than food and feed	

Genetically modified soybean			
Transformation event/ Unique ID/ Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
Soya (MON40-3-2) <u>MON-04032-6</u> Monsanto	Genetically modified soya that contains: cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate	Food containing, consisting of, or produced from MON 40-3-2 soybean (including food additives)	Renewal of authorisation ongoing
		Feed containing or consisting of MON 40-3-2 soybean	Renewal of authorisation ongoing
		Feed produced from MON 40-3-2 soybean (feed materials and feed additives)	Renewal of authorisation ongoing
		Other products containing or consisting of MON 40-3-2 soybean with the exception of cultivation	Renewal of authorisation ongoing
Soybean (A2704-12) <u>ACS-GM005-3</u> Bayer	Genetically modified soybean that contains: pat gene inserted to confer tolerance to the glyphosinate-ammonium herbicide	Foods and food ingredients containing, consisting of, or produced from ACS-GM005-3 soybean (including food additives)	07/09/2018
		Feed containing, consisting of, or produced from ACS-GM005-3 soybean (feed materials and feed additives)	
		Products other than food and feed containing or consisting of ACS-GM005-3 soybean for the same uses as any other soybean with the exception of cultivation	
Soybean (MON89788) <u>MON-89788-1</u> Monsanto	Genetically modified soybean that contains: cp4 epsps gene inserted to confer tolerance to the herbicide glyphosate	Foods and food ingredients containing, consisting of, or produced from MON-89788-1 soybean (including food additives)	03/12/2018
		Feed containing, consisting of, or produced from MON-89788-1 soybean (feed materials and feed additives)	
		Products other than food and feed containing or consisting of MON-89788-1 soybean for the same uses as any other soybean with the exception of cultivation	

Genetically modified sugar beet			
Transformation event/ Unique ID/ Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
Sugar beet (H7-1) KM-00071-4 KWS SAAT and Monsanto	Genetically modified sugar beet that expresses: a CP4 EPSPS protein confers tolerance to glyphosate containing herbicides	Foods and food ingredients produced from KM-000H71-4 sugar beet	23/10/2017
		Feed produced from KM-000H71-4 sugar beet	

Genetically modified microorganisms			
Transformation event/ Unique ID/ Company	Genes Introduced / Characteristics	Authorized use	Authorization Expiration Date
Bacterial biomass (pCABL- Bacterial biomass) Ajinomoto Eurolysine SAS	Bacterial protein, by-product from the production by fermentation of L-Lysine HCl obtained from (Brevibacterium lactofermentum) the recovered killed microorganisms. The source is the Brevibacterium lactofermentum strain SO317/pCABL	Feed produced from GMO bacteria: " bacterial biomass"	Renewal of authorisation ongoing
Yeast biomass (pMT742 or pAK729-Yeast biomass) NOVO Nordisk A/S	NOVO Yeast Cream is a product produced from genetically modified yeast strains (Saccharomyces cerevisiae) cultivated on substrates of vegetable origin. The source is the Saccharomyces cerevisiae strain MT663/pMT742 or pAK729	Feed materials produced from GMO yeast: "yeast biomass"	Renewal of authorisation ongoing

Zdroj: http://ec.europa.eu/food/dyna/gm_register/index_en.cfm