LIVING MODIFIED ORGANISM (LMO)

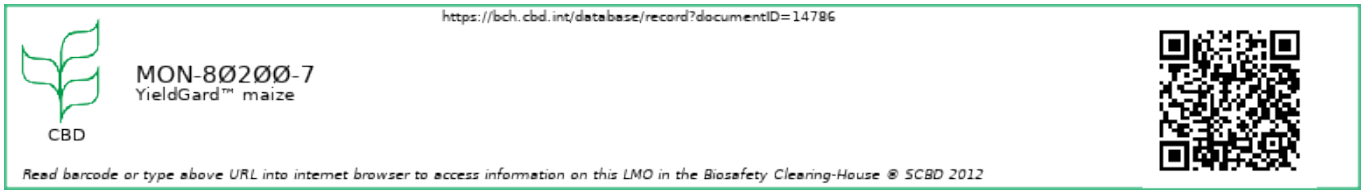
BCH-LMO-SCBD-14786-5

? Decisions on the LMO ? Risk Assessments

LAST UPDATED: 14 SEP 2012

Living Modified Organism identity

The image below identifies the LMO through its unique identifier, trade name and a link to this page of the BCH. Click on it to download a larger image on your computer. For help on how to use it go to the LMO quick-links page.



Name

YieldGard™ maize | EN

Transformation event

MON802

Unique identifier

MON-8Ø2ØØ-7

Developer(s)

- ORGANIZATION: MONSANTO | BCH-CON-SCBD-14925-3

ORGANIZATION

Monsanto
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Description

The transgenic maize line MON802 was genetically engineered to resist ECB by producing its own insecticide. This line was developed by introducing the cry1Ab gene, isolated from the common soil bacterium Bacillus thuringiensis (Bt), into the maize line by particle acceleration (biolistic) transformation. MON802 was further engineered to express resistance to | EN

glyphosate, the active ingredient in the herbicide Roundup®, allowing for its use as a weed control option. In order to obtain field tolerance to glyphosate herbicide, two novel genes, CP4 epsps and goxv247, were introduced maize by particle acceleration (biolistic) transformation.

Recipient Organism or Parental Organisms

The term “Recipient organism” refers to an organism (either already modified or non-modified) that was subjected to genetic modification, whereas “Parental organisms” refers to those that were involved in cross breeding or cell fusion.

BCH-ORGA-SCBD-246-6 ORGANISM | ZEA MAYS (MAIZE, CORN, MAIZE)

Crops

Characteristics of the modification process

Vector

PV-ZMBK15 and PV-ZMGT03 EN

Techniques used for the modification

Biolistic / Particle gun

Genetic elements construct

P-e35S-CaMV 0.640 kb	I-hsp70-MAIZE 0.810 kb	CS-Cry1Ab-BACTU 3.470 kb	T-nos-RHIRD 0.000 kb	
P-e35S-CaMV 0.640 kb	I-hsp70-MAIZE 0.810 kb	TP-ctp2-ARATH 0.310 kb	CS-CP4epsps-RHIRD 1.400 kb	T-nos-RHIRD 0.270 kb
P-e35S-CaMV 0.640 kb	I-hsp70-MAIZE 0.810 kb	TP-rbcS 0.260 kb	CS-gox-OCHAN 1.800 kb	T-nos-RHIRD 0.270 kb

Introduced or modified genetic element(s)

Some of these genetic elements may be present as fragments or truncated forms. Please see notes below, where applicable.

BCH-GENE-SCBD-14985-12 CRY1AB | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU

Protein coding sequence | Resistance to diseases and pests (Insects, Lepidoptera (butterflies and moths))

BCH-GENE-SCBD-14979-7 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASE GENE

Protein coding sequence | Resistance to herbicides (Glyphosate)

BCH-GENE-SCBD-14998-4 GLYPHOSATE OXIDOREDUCTASE GENE

Protein coding sequence | Resistance to herbicides (Glyphosate)

BCH-GENE-SCBD-15001-5 NEOMYCIN PHOSPHOTRANSFERASE II | (BACTERIA)

Protein coding sequence | Resistance to antibiotics (Kanamycin)

BCH-GENE-SCBD-100366-6 CAMV ENHANCED 35S PROMOTER

Promoter

BCH-GENE-SCBD-100359-7 HSP70 INTRON | (MAIZE, CORN)

Intron

BCH-GENE-SCBD-100269-8 NOPALINE SYNTHASE GENE TERMINATOR
Terminator

BCH-GENE-SCBD-100365-6 CHLOROPLAST TRANSIT PEPTIDE 2 | (THALE CRESS)
Transit signal

BCH-GENE-SCBD-101902-4 RBCS TRANSIT PEPTIDE | (THALE CRESS)
Transit signal

Notes regarding the genetic elements present in this LMO

Plasmid PV-ZMBK15 contained the synthetic cry1Ab gene and the CP4 EPSPS encoding gene from A. tumefaciens strain CP4. Plasmid PV-ZMGT03 the goxv247 gene from Ochrobactrum anthropi.	EN

LMO characteristics

Modified traits

Resistance to diseases and pests
Insects
Lepidoptera (butterflies and moths)
European corn borer (Ostrinia nubilalis)
Resistance to herbicides
Glyphosate
Resistance to antibiotics
Kanamycin

Common use(s) of the LMO

Food
Feed

Additional Information

Additional Information

The cry1Ab gene produces the insect control protein Cry1Ab, a delta-endotoxin. The Cry1Ab protein produced by the Bt maize is identical to that found in nature and in commercial Bt spray formulations. Cry proteins, of which Cry1Ab is only one, act by selectively binding to specific sites localized on the lining of the midgut of susceptible insect species. Following binding, pores are formed that disrupt midgut ion flow, causing gut paralysis and eventual death due to bacterial sepsis. Cry1Ab is lethal only when eaten by the larvae of lepidopteran insects (moths and butterflies), and its specificity of action is directly attributable to the presence of specific binding sites in the target insects. There are no binding sites for the delta-endotoxins of B. thuringiensis on the surface of mammalian intestinal cells, therefore, livestock animals and humans are not susceptible to these proteins.

In plants, the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (abbreviated EPSPS) plays a key role in the biochemical pathway that results in the synthesis of the aromatic amino acids phenylalanine, tyrosine, and tryptophan. This enzyme is only present in plants and microorganisms, such as bacteria and fungi, and is not present in animals and humans. The simple amino acid

analogue glyphosate selectively inhibits the activity of the EPSPS enzyme, thus shutting off aromatic amino acid synthesis. Because these amino acids are needed for protein synthesis, which is required for plant growth and maintenance, the application of glyphosate quickly results in plant death. EPSPS is not present in mammals, birds or aquatic life forms, which do not synthesize their own aromatic amino acids. For this reason, glyphosate has little toxicity to these organisms.

A gene encoding a glyphosate-tolerant form of the EPSPS enzyme was isolated from the CP4 strain of Agrobacterium tumefaciens, a common soil bacterium, and introduced into the maize genome using micro-particle bombardment. MON802 contains a third gene that codes for a modified version of the enzyme glyphosate oxidase (GOX), which accelerates the normal breakdown of glyphosate into two non-toxic products, aminomethylphosphonic acid (AMPA) and glyoxylate. AMPA is the principal breakdown product of glyphosate and is degraded by several microorganisms, while glyoxylate is commonly found in plant cells and is broken down by the glyoxylic pathway for lipid metabolism. The GOX encoding gene (goxv247) was isolated from the bacterium Ochrobactrum anthropi strain LBAA.

Other relevant website addresses and/or attached documents

? OECD UID Database *(English)*

? CERA GM Database *(English)*

? MON802 - APHIS *(English)*

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Further Information

Questions about the Cartagena Protocol on Biosafety or the operation of the Biosafety Clearing-House may be directed to the Secretariat of the Convention on Biological Diversity.

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