LIVING MODIFIED ORGANISM (LMO)

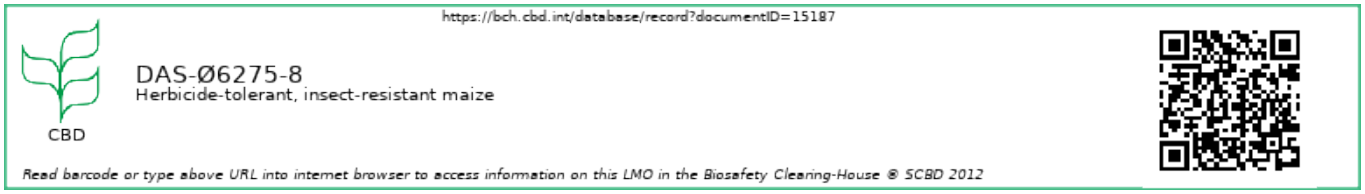
BCH-LMO-SCBD-15187-5

? Decisions on the LMO ? Risk Assessments

LAST UPDATED: 09 APR 2013

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

Herbicide-tolerant, insect-resistant maize | EN

Transformation event

TC6275

Unique identifier

DAS-Ø6275-8

Developer(s)

- ORGANIZATION: DOW AGROSCIENCES | BCH-CON-SCBD-14939-1

ORGANIZATION

Dow AgroSciences
Website: http://www.dowagro.com/homepage/index.htm

Description

Insect-resistant and glufosinate ammonium herbicide tolerant maize produced by inserting the cry1F gene from Bacillus thuringiensis var. aizawai which confers resistance against certain lepidopteran pests, such as the European corn borer (Ostrinia nubilalis) and Sesamia spp, and the phosphinothricin N-acetyltransferase encoding gene (PAT) bar gene from Streptomyces hygroscopicus which confers tolerance to application of glufosinate-ammonium herbicide. | EN

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

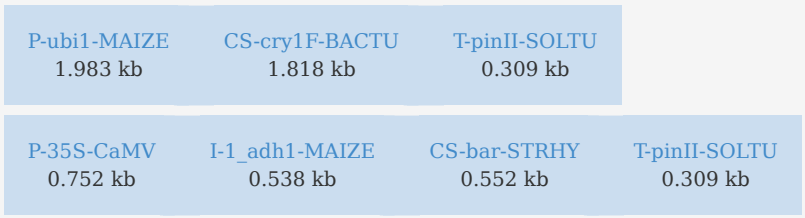
Vector

PHP12537 EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct



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-14987-8 CRY1F | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU

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

BCH-GENE-SCBD-14972-12 PHOSPHINOTHRICIN N-ACETYLTRANSFERASE GENE

Protein coding sequence | Resistance to herbicides (Glufosinate)

BCH-GENE-SCBD-100362-7 UBIQUITIN GENE PROMOTER | (MAIZE, CORN)

Promoter

BCH-GENE-SCBD-100367-4 PROTEINASE INHIBITOR II GENE TERMINATOR | (POTATO)

Terminator

BCH-GENE-SCBD-100287-7 CAMV 35S PROMOTER

Promoter

BCH-GENE-SCBD-104337-2 ALCOHOL DEHYDROGENASE 1, INTRON 1 | (MAIZE, CORN)

Intron

Notes regarding the genetic elements present in this LMO

Ubiquitin gene promoter includes the promoter region, first intron and 5' UTR.

The CaMV 35s promoter includes an additional copy of the upstream enhancer region of the promoter at the 5' end of the promoter.

Cry1F truncated coding sequence was modified for plant optimised expression but has an identical amino acid sequence as the first 1-605 of the native Cry1F protein except for a single amino acid residue substitution F604L.

EN

Southern blot analysis indicated that a single truncated copy of the transformation cassette was integrated into the host genome. a truncation of the ubiquitin promoter and intron were shown. Analysis also indicated that there was no integration of segments of the vector backbone.

LMO characteristics

Modified traits

Resistance to diseases and pests
Insects
Lepidoptera (butterflies and moths)
Resistance to herbicides
Glufosinate

Common use(s) of the LMO

Food
Feed

Additional Information

Additional Information

The transgenic maize line TC6275 was genetically engineered to resist European Corn Borer (ECB), Southwestern corn borer (SWCB), fall armyworm (FAW), and black cutworm (BCW), and to a limited extent, corn earworm (CEW), by producing its own insecticide. TC6275 was also developed to express tolerance to the herbicide glufosinate ammonium. Two novel genes, a truncated cry1F gene and the bar gene were introduced into the maize hybrid line Hi-II using Agrobacterium-mediated transformation.

The cry1F gene, isolated from the common soil bacterium Bacillus thuringiensis var. aizawai, produces the insect control protein Cry1F, a delta-endotoxin. Cry proteins, of which Cry1F 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. Cry1F 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.

TC6275 maize also was developed to allow for the use of glufosinate ammonium as a weed control option, and as a breeding tool for selecting plants containing the cry1F gene. The herbicidal mode of action of glufosinate ammonium is related to the activity of glutamine synthetase (GS), the enzyme required for the synthesis of the amino acid glutamine. L-phosphinothricin, the active ingredient of glufosinate ammonium, is a structural analog of glutamate, and acts as a competitive inhibitor. After application of the herbicide, L-phosphinothricin competes with glutamine for its active sites on GS. The results of the inhibition of GS are an accumulation of ammonia in the plant, a reduction in the synthesis of glutamine, and an inhibition of photosynthesis. This causes the death

of plant cells, and eventually, the entire plant. TC6275 maize contains the bar gene, which codes for the production of the enzyme phosphinothricin acetyl-transferase (PAT). This enzyme acetylates L-phosphinothricin rendering it inactive in the plant. The PAT enzyme is not known to have any toxic properties. The bar gene was isolated from the soil bacterium Streptomyces hygroscopius, the same organism from which L-phosphinothricin was originally isolated.

Other relevant website addresses and/or attached documents

? CERA GM Database *(English)*

? DAS-Ø6275-8 - OECD *(English)*

? DAS-Ø6275-8 - Dow.pdf *(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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