

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-115717-3

[? Decisions on the LMO ? Risk Assessments](#)

LAST UPDATED: 25 MAR 2022


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.



MON-87427-7 × DAS-40278-9
Herbicide tolerant maize

<https://bch.cbd.int/database/record?documentID=115717>



Read barcode or type above URL into internet browser to access information on this LMO in the Biosafety Clearing-House © SCBD 2012

Name

Herbicide tolerant maize

EN

Transformation event

MON87427 × DAS40278

Unique identifier

MON-87427-7 × DAS-40278-9

Developer(s)

- [PERSON: DOW AGROSCIENCES GMBH](#) | [BCH-CON-SCBD-104809-2](#)

PERSON

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RELATED ORGANIZATION

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Description

The modified maize (*Zea mays*) was produced through cross breeding of modified parental lines to express tolerance to multiple herbicides. For glyphosate tolerance, the maize expresses *Agrobacterium tumefaciens* 5-enolpyruvylshikimate-3-phosphate synthase, which encodes a variant of an endogenous enzyme involved in the essential biosynthesis of aromatic amino acids (shikimate pathway). The variant prevents the binding of the compound to the enzyme and the subsequent inactivation. In addition, the modified maize expresses *Sphingobium herbicidovorans* aryloxyalkanoate dioxygenase, which cleaves 2,4-dichlorophenoxyacetic acid into non-herbicidal dichlorophenol and glyoxylate, as well as inactivates aryloxyphenoxypropionate herbicides (acetyl-CoA carboxylase inhibitors).

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

BCH-LMO-SCBD-104758-3 LIVING MODIFIED ORGANISM | MON-87427-7 - MAIZE MODIFIED FOR TISSUE SELECTIVE GLYPHOSATE TOLERANCE |

Resistance to herbicides - Glyphosate

BCH-LMO-SCBD-104814-1 LIVING MODIFIED ORGANISM | DAS-40278-9 - ENLIST™ MAIZE |

Dow AgroSciences GmbH Resistance to herbicides Tolerance to 2,4-Dichlorophenoxyacetic acid Tolerance to aryloxyphenoxypropionate

Characteristics of the modification process

Vector

PV-ZMAP1043; pDAS1740

EN

Techniques used for the modification

Cross breeding

Genetic elements construct

P-e35S-CaMV
0.620 kb

I-hsp70-MAIZE
0.800 kb

TP-ctp2-ARATH
0.230 kb

CS-CP4epsps-RHIRD
1.370 kb

T-nos-RHIRD
0.250 kb

E-rb7_mar-TOBAC
1.170 kb

P-ubi1-MAIZE
1.990 kb

CS-aad1-SPHHE
0.890 kb

T-per5-MAIZE
0.370 kb

E-rb7_mar-TOBAC
1.170 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-100366-6 CAMV ENHANCED 35S PROMOTER |

Promoter

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

Intron

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

Transit signal

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

Protein coding sequence | Resistance to herbicides (Glyphosate)

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

Terminator

BCH-GENE-SCBD-104795-4 RB7 MATRIX ATTACHMENT REGION | (TOBACCO PLANT) |

Enhancer

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

Promoter

BCH-GENE-SCBD-104812-3 ARYLOXYALKANOATE DIOXYGENASE GENE |

Protein coding sequence | Resistance to herbicides, Tolerance to 2,4-Dichlorophenoxyacetic acid, Tolerance to aryloxyphenoxypropionate

BCH-GENE-SCBD-104813-4 PER5 3' UNTRANSLATED REGION | (MAIZE, CORN) |

Terminator

Notes regarding the genetic elements present in this LMO

DNA insert from MON87427 (MON-87427-7) vector PV-ZMAP1043

Transcription of *Agrobacterium tumefaciens* 5-enolpyruvylshikimate-3-phosphate synthase (*epsps*) commences from the *Cauliflower mosaic virus* (CaMV) enhanced 35S promoter and terminates at the *A. tumefaciens* nopaline synthase (*nos*) terminator. The transcript contains a *Zea mays* heat shock protein 70 (*hsp70*) intron, an *Arabidopsis thaliana* N-terminal chloroplast transit peptide sequence for chloroplast targeting of the protein and *epsps*. The CaMV enhanced 35S promoter-*hsp70* combination promotes gene expression in female and vegetative tissues, but not in male reproductive tissues (pollen microspores and tapetum).

Note:

- Southern blot analyses indicate that a single copy of the T-DNA was inserted at a single site in the parental maize genome and no plasmid vector backbone sequences were detected to have been integrated. DNA sequencing analyses further indicated that the expected T-DNA sequences were integrated.
- The *epsps* coding sequence is the codon optimized coding sequence of the *aroA* gene from *Agrobacterium sp.* strain CP4 encoding EPSPS.

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DNA insert from DAS40278 (DAS-40278-9) vector pDAS1740

The LMO was generated using the Whiskers-mediated transformation method. *Sphingobium herbicidovorans* aryloxyalkanoate dioxygenase-1 (*aad-1*) is under the control of *Zea mays* ubiquitin gene promoter and *Z. mays* root preferential cationic peroxidase terminator. Elevated levels of transcription are expected to occur due to the constitutive nature of the ubiquitin promoter.

Note:

- The *aad-1* coding sequence was optimized for expression in the plant.
- Southern blot analysis indicated that a single complete copy of the transformation cassette was stably integrated into the host genome at a single locus
- No integration of the vector backbone occurred.

Kindly refer to the parental LMO records for more information.

LMO characteristics

Modified traits

Resistance to herbicides

Glyphosate

Other

Tolerance to 2,4-dichlorophenoxyacetic acid

Tolerance to aryloxyphenoxypropionate

Common use(s) of the LMO

Feed

Food

Detection method(s)

External link(s)

? [MON-87427-7 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (English)

? [DAS-40278-9 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (English)

Additional Information

Additional Information

EPSPS expression is absent or limited in male reproductive tissues, which eliminates or reduces the need for detasseling when MON-87427-7 is used as female parent in hybrid maize seed production.

Other relevant website addresses and/or attached documents

? [EUGenius: MON87427 x DAS40278](#) (English)

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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on Biological Diversity**

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