

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-14776-17

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

LAST UPDATED: 08 NOV 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.



MON-00603-6
Roundup Ready™ maize

<https://bch.cbd.int/database/record?documentID=14776>



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

Name

Roundup Ready™ maize

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Transformation event

NK603

Unique identifier

MON-00603-6

Developer(s)

- [ORGANIZATION: MONSANTO](#) | [BCH-CON-SCBD-14925-3](#)

ORGANIZATION

Monsanto
800 North Lindbergh Blvd.
St. Louis, MO
63167, United States of America
Phone: + 1 314 694-1000
Fax: +1 314 694-3080
Website: <http://www.monsanto.com>

Description

The NK603 line of maize was developed to allow the use of glyphosate, the active ingredient in the herbicide Roundup®, as a weed control option. NK603 contains a form of the plant enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) that allows the plant to survive the otherwise lethal application of glyphosate.

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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-ZMGT32

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Techniques used for the modification

Biolistic / Particle gun

Genetic elements construct

[P-act1-ORYSA](#)
0.800 kb

[I-1_act1-ORYSA](#)
0.600 kb

[TP-ctp2-ARATH](#)
0.200 kb

[CS-CP4epsps-RHIRD](#)
1.400 kb

[T-nos-RHIRD](#)
0.300 kb

[P-e35S-CaMV](#)
0.600 kb

[I-hsp70-MAIZE](#)
0.800 kb

[TP-ctp2-ARATH](#)
0.200 kb

[CS-CP4epsps-RHIRD](#)
1.400 kb

[T-nos-RHIRD](#)
0.300 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-14979-7](#) 5-ENOLPYRUVYL SHIKIMATE-3-PHOSPHATE SYNTHASE GENE |

Protein coding sequence | Resistance to herbicides (Glyphosate)

[BCH-GENE-SCBD-100364-5](#) RICE ACTIN 1 GENE PROMOTER | (RICE) |

Promoter

[BCH-GENE-SCBD-100355-6](#) RICE ACTIN 1, INTRON | (RICE) |

Intron

[BCH-GENE-SCBD-100269-8](#) NOPALINE SYNTHASE GENE TERMINATOR |

Terminator

[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-100366-6](#) CAMV ENHANCED 35S PROMOTER |

Promoter

Notes regarding the genetic elements present in this LMO

Notes about the Other(s) sequence(s) specific to this LMO

The plant expression plasmid vector, PV-ZMGT32 contains two adjacent plant gene

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expression cassettes each containing a single copy of the cp4 epsps. In the first (5' end) expression cassette, the cp4 epsps gene is under the regulation of the rice actin promoter (P-Ract1) and the rice actin intron (I-Ract1). The second cassette, which is fused to the 3' end of the first, consists of the cp4epsps gene regulated by the enhanced cauliflower mosaic virus 35S promoter (e35S) (P-e35S is a 0.61Kb long sequence containing the promoter and leader for the cauliflower mosaic virus (CaMV) 35S RNA containing the duplicated enhancer region. This modification was made to enhance the activity of this promoter in plants.) and intron from the corn heat shock protein 70 (HSP70). Both expression cassettes incorporate the 3'untranslated region of the nopaline synthase gene (nos 3') for signal polyadenylation.

The vector also contains the *nptII* gene encoding kanamycin resistance allowing selection of bacteria containing the plasmid, and an origin of replication (ori) necessary for replicating the plasmid in Escherichia coli. For the transformation through particle bombardment, a fragment of the vector (obtained after digestion with the restriction enzyme MluI) was used which contains only the two *cp4 epsps* gene expression cassettes. Therefore, the *nptII* gene and the origin of replication were not inserted into NK603.

Corn NK603 contains one insertion site containing a single copy of the linear DNA of PV-ZMGT32 used for transformation. Both cp4 epsps gene cassettes within the single insert which are intact.

LMO characteristics

Modified traits

Resistance to herbicides
Glyphosate

Common use(s) of the LMO

Food
Feed
Biofuel

Detection method(s)

External link(s)

? [MON-ØØ6Ø3-6 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\) \(English \)](#)
? [MON-ØØ6Ø3-6 - CropLife International Detection Methods Database \(English \)](#)

Additional Information

Additional Information

Glyphosate specifically binds to and inactivates the enzyme EPSPS, which is part of an important plant biochemical pathway called the shikimate pathway. The shikimate pathway is involved in the biosynthesis of the aromatic amino acids tyrosine, phenylalanine and tryptophan, as well as other aromatic compounds. When conventional plants are treated with glyphosate they cannot produce the aromatic amino acids essential to their survival. The modified maize line permits farmers to use

glyphosate-containing herbicides for weed control in the cultivation of maize. The EPSPS enzyme is present in all plants, bacteria and fungi, but not in animals, which do not synthesize their own aromatic amino acids. Thus, EPSPS is normally present in food derived from plant and microbial sources.

Other relevant website addresses and/or attached documents

? [OECD UID Database: MON-00603-6 \(English \)](#)

? [CERA GM Database \(English \)](#)

? [BATS \(2003\) Genetically Modified \(GM\) Crops: molecular and regulatory details, v.2.pdf \(English \)](#)

[BCH-LMO-SCBD-14776-17](#)

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.

**Secretariat of the Convention
on Biological Diversity**

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