

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)

BCH-LMO-SCBD-101287-12

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

LAST UPDATED: 12 FEB 2021

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.



SYN-E3272-5 X SYN-BT011-1 X SYN-IR604-5 X MON-00021-9
Modified thermostable alpha-amylase, insect-resistant, herbicide-tolerant maize

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

<https://bch.cbd.int/database/record?documentID=101287>


Name

Modified thermostable alpha-amylase, insect-resistant, herbicide-tolerant maize

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Transformation event

3272 x Bt11 x MIR604 x GA21

Unique identifier

SYN-E3272-5 x SYN-BT011-1 x SYN-IR604-5 x MON-00021-9

Developer(s)

- **ORGANIZATION:** SYNGENTA JAPAN K.K. | [BCH-CON-JP-38695-2](#)

ORGANIZATION

Syngenta Japan K.K.
401-2, Mukounodai, Takatsuhara, Tako-machi,
Katori-gun, Chiba
289-2304, Japan
Website: <http://www.syngentaseeds.co.jp/>

Description

The stacked maize line SYN-E3272-5, SYN-BT011-1, SYN-IR604-5 and MON-00021-9 was obtained through the traditional cross breeding of each of the parental organisms to produce a maize that expresses each of amy797E alpha amylase, PMI, Cry1Ab, PAT, mCry3A and EPSPS genes. The expression of these genes are expected to confer resistance to Lepidoptera and Coleoptera, and tolerant to glufosinate and glyphosate herbicide as well as the synthesis of thermostable alpha-amylase.

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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

BCH-LMO-SCBD-15109-9 LIVING MODIFIED ORGANISM | SYN-E3272-5 - ENOGEN™ MAIZE |

Mannose tolerance Selectable marker genes and reporter genes Thermostable alpha-amylase Use in industrial applications - Biofuel production

BCH-LMO-SCBD-14797-15 LIVING MODIFIED ORGANISM | SYN-BTØ11-1 - YIELDGARD™ MAIZE |

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

BCH-LMO-SCBD-15105-12 LIVING MODIFIED ORGANISM | SYN-IR6Ø4-5 - AGRISURE™ RW ROOTWORM-PROTECTED MAIZE |

Mannose tolerance Resistance to diseases and pests - Insects - Coleoptera (beetles) - Western corn rootworm (Diabrotica virgifera) Selectable marker genes and reporter genes

BCH-LMO-SCBD-14794-18 LIVING MODIFIED ORGANISM | MON-ØØØ21-9 - ROUNDUP READY™ MAIZE |

Resistance to herbicides - Glyphosate

Related LMO(s)

BCH-LMO-SCBD-43635-9 | SYN-BTØ11-1 x SYN-IR6Ø4-5 x MON-ØØØ21-9 - Agrisure™ 3000GT Maize | Syngenta Crop Protection AG | Mannose tolerance, Resistance to diseases and pests (Insects, Coleoptera (beetles), Lepidoptera (butterflies and moths), European corn borer (Ostrinia nubilalis)), Resistance to herbicides (Glufosinate, Glyphosate), Selectable marker genes and reporter genes
[Show detection method\(s\)](#)

Characteristics of the modification process

Vector

pNOV7013, pZO1502, pZM26 and pDPG434

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Techniques used for the modification

Cross breeding

Genetic elements construct

P-gz27-MAIZE 0.680 kb	CS-amy797E 1.380 kb	TP-SEKDEL 0.010 kb	I-9_pepc-MAIZE 0.110 kb	T-35S-CaMV 0.070 kb
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P-ubi1-MAIZE 1.990 kb	I-1_ubi1-MAIZE 0.000 kb	CS-pmi-ECOLX 1.180 kb	T-nos-RHIRD 0.250 kb
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P-35S-CaMV 0.510 kb	I-ADH1 intron 6 0.470 kb	CS-Cry1Ab-BACTU 1.850 kb	T-nos-RHIRD 0.250 kb
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P-35S-CaMV 0.420 kb	I-ADH1 intron 2 0.180 kb	CS-pat-STRVR 0.550 kb	T-nos-RHIRD 0.250 kb
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P-MTL-MAIZE 2.560 kb	CS-mCry3A 1.800 kb	T-nos-RHIRD 0.250 kb
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P-ubi1-MAIZE 0.980 kb	I-1_ubi1-MAIZE 1.010 kb	CS-pmi-ECOLX 1.180 kb	T-nos-RHIRD 0.250 kb
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P-act1-ORYSA 1.370 kb	I-1_act1-ORYSA 0.000 kb	TP-OPT 0.370 kb	CS-epsps-MAIZE 1.340 kb	T-nos-RHIRD 0.240 kb
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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-14966-7 AMY797E ALPHA AMYLASE | THERMOCOCCALES SPP. - THERMOCOCCUS |

Protein coding sequence | Thermostable alpha-amylase, Use in industrial applications (Biofuel production)

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-15002-4 PHOSPHINOTHRICIN N-ACETYLTRANSFERASE GENE |

Protein coding sequence | Resistance to herbicides (Glufosinate)

BCH-GENE-SCBD-15003-7 PHOSPHOMANNOSE ISOMERASE GENE | (BACTERIA) |

Protein coding sequence | Mannose tolerance, Selectable marker genes and reporter genes

BCH-GENE-SCBD-43634-3 MCry3A | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU |

Protein coding sequence | Resistance to diseases and pests (Insects, Coleoptera (beetles), Western corn rootworm (Diabrotica virgifera))

BCH-GENE-SCBD-103622-5 27KD GAMMA-ZEIN PROMOTER | (MAIZE, CORN) |

Promoter

BCH-GENE-SCBD-102033-4 SEKDEL ER RETENTION SIGNAL |

Transit signal

BCH-GENE-SCBD-101406-4 PHOSPHOENOLPYRUVATE CARBOXYLASE, INTRON 9 | (MAIZE, CORN) |

Intron

BCH-GENE-SCBD-100290-6 CAMV 35S TERMINATOR |

Terminator

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

Promoter

BCH-GENE-SCBD-103627-5 UBIQUITIN INTRON 1 | (MAIZE, CORN) |

Intron

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

Terminator

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

Promoter

BCH-GENE-SCBD-103625-2 ALCOHOL DEHYDROGENASE 1, INTRON 6 | (MAIZE, CORN) |

Intron

BCH-GENE-SCBD-103867-1 ALCOHOL DEHYDROGENASE 1, INTRON 2 | (MAIZE, CORN) |

Intron

[BCH-GENE-SCBD-103881-2](#) METALLOTHIONEIN-LIKE GENE PROMOTER | (MAIZE, CORN) |

Promoter

[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-101419-4](#) OPTIMIZED TRANSIT PEPTIDE |

Transit signal

[BCH-GENE-SCBD-46333-8](#) 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASE | (MAIZE, CORN) |

Protein coding sequence | Resistance to herbicides (Glyphosate)

Notes regarding the genetic elements present in this LMO

DNA insert from 3272 vector pNOV7013

Maize containing thermostable alpha-amylase (for optimised bioethanol production) through introduction of the amy797E gene from Thermococcales (thermostable bacterium). The pmi gene expresses the PMI protein, which allows the transformed plants to use mannose as an energy source and is used as a selectable marker.

DNA insert from Bt11 vector pZO1502

Insect-resistant and herbicide tolerant maize produced by inserting the cry1Ab gene to confer resistance to the European corn borer (*Ostrinia nubilalis*), and the phosphinothricin N-acetyltransferase (PAT) encoding gene to confer tolerance to phosphinothricin (PPT) herbicide, specifically glufosinate ammonium.

DNA insert from MIR604 vector pZM26

MIR604 is a genetically modified to confer field protection against corn root worms. The cry3A gene codes for a Bt-toxin (Cry3A), which confers resistance to coleopteran species. Expression of the pmi gene allows the plant to use mannose as a carbon source through production of the PMI protein, and is used as a selectable marker.

DNA insert from GA21 vector pDPG434

The GA21 line of maize was modified to be tolerant of glyphosate-containing herbicides. The isolated endogenous maize epsps gene was modified through site-directed mutagenesis, such that its encoded enzyme was insensitive to inactivation by glyphosate, and inserted into the inbred AT maize variety.

For additional information on this LMO, please refer to the records of the parental LMOs.

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LMO characteristics

Modified traits

Resistance to diseases and pests

Insects

Coleoptera (beetles)

Western corn rootworm (*Diabrotica virgifera*)

Lepidoptera (butterflies and moths)

European corn borer (*Ostrinia nubilalis*)

Resistance to herbicides

Glufosinate

Glyphosate

Use in industrial applications

Biofuel production

Selectable marker genes and reporter genes

Common use(s) of the LMO

Food

Feed

Biofuel

Detection method(s)

External link(s)

? [SYN-E3272-5 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (*English*)

? [SYN-BTØ11-1 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (*English*)

? [SYN-IR6Ø4-5 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (*English*)

? [MON-ØØØ21-9 - EU Reference Laboratory for GM Food and Feed \(EURL-GMFF\)](#) (*English*)

[BCH-LMO-SCBD-101287-12](#)

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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