

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-258904-1

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

LAST UPDATED: 17 JAN 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.



Insect-resistant cotton

CBD

<https://bch.cbd.int/database/record?documentID=258904>



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

Name

Insect-resistant cotton

EN

Transformation event

NIBGE-1601

Developer(s)

- [ORGANIZATION](#): NATIONAL INSTITUTE FOR BIOTECHNOLOGY AND GENETIC ENGINEERING | [BCH-CON-SCBD-258897-1](#)

ORGANIZATION

National Institute for Biotechnology and Genetic Engineering

Academic or research institute

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Email: nibge.gmotesting@gmail.com

Website: <http://www.nibge.org/Default.aspx>

Description

The cotton (*Gossypium hirsutum*) was modified for resistance to Lepidoptera insects through the expression of *Bacillus thuringiensis* crystal proteins Cry1Ac and Cry2Ab2. Upon protease cleavage and activation in the insect's midgut, the bioactive core toxins form pores, which disrupt osmotic balance and eventually result in cell lysis and insect death. In addition to the

EN

insecticidal proteins, the cotton expresses an *Escherichia coli* neomycin phosphotransferase II cassette for kanamycin selection during 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-12080-6 ORGANISM | GOSSYPIUM HIRSUTUM (COTTON) |

Crops

Point of collection or acquisition of the recipient organism or parental organisms

Coker 312 cultivar

EN

Characteristics of the modification process

Vector

pGA482

EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct

V-RB-RHIRD 0.000 kb	P-nos-RHIRD 0.000 kb	CS-nptII-ECOLX 0.000 kb	T-nos-RHIRD 0.000 kb
P-34S-FMV 0.429 kb	TP-ctp2-ARATH 0.228 kb	CS-Cry2Ab2-BACTU 1.914 kb	T-tr7-RHIRD 0.220 kb
T-35S-CaM 0.773 kb	CS-cry1Ac-BA 1.876 kb	P-e35S-C 0.875 kb	V-LB-RHIRD 0.000 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-101416-6 TI PLASMID RIGHT BORDER REPEAT |

Plasmid vector

BCH-GENE-SCBD-100270-6 NOPALINE SYNTHASE GENE PROMOTER |

Promoter

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

Protein coding sequence | Resistance to antibiotics (Kanamycin)

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

Terminator

BCH-GENE-SCBD-101507-5 FMV 34S PROMOTER |

Promoter

BCH-GENE-SCBD-14988-7 CRY2AB2 | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU |

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

BCH-GENE-SCBD-103067-9 TRANSCRIPT 7 GENE 3' UNTRANSLATED REGION |

Terminator

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

Terminator

BCH-GENE-SCBD-14986-6 CRY1AC | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU |

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

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

Promoter

BCH-GENE-SCBD-101415-9 TI PLASMID LEFT BORDER REPEAT |

Plasmid vector

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

Transit signal

Notes regarding the genetic elements present in this LMO

The modified cotton contains three gene cassettes: *Escherichia coli* neomycin phosphotransferase II (*nptII*); *Bacillus thuringiensis cry2Ab2*; and *B. thuringiensis cry1Ab*.

The *nptII* coding sequence is under control of an *Agrobacterium* nopaline synthase promoter and terminator.

The *cry2Ab2* coding sequence is under control of a *Figwort mosaic virus* 34S promoter and an *A. tumefaciens* transcript 7 gene 3' untranslated region. An *Arabidopsis thaliana* 5-enolpyruvylshikimate-3-phosphate synthase signal sequence (chloroplast transit peptide 2) was added to target the translated Cry2Ab2 protein to the chloroplast.

The *cry1Ac* coding sequence is under control of a *Cauliflower mosaic virus* 35S enhanced promoter and 35S terminator. Due to the duplicated enhancer regions and the constitutive nature of the promoter high levels of expression are expected.

Note:

- The *nptII* cassette was originally sourced from pGA482. The base pair sizes of the genetic elements in this cassette were not found.

EN

LMO characteristics

Modified traits

Resistance to diseases and pests

Insects

Lepidoptera (butterflies and moths)

Cotton bollworm (*Helicoverpa* spp.)

European corn borer (*Ostrinia nubilalis*)

Fall armyworm (*Spodoptera frugiperda*)

Resistance to antibiotics

Kanamycin

Neomycin
Selectable marker genes and reporter genes

Common use(s) of the LMO

Fiber/textile

Detection method(s)

External link(s)

? [\[PDF\] Development of event-specific detection method for identification of insect resistant NIBGE-1601 cotton harboring double gene Cry1Ac-Cry2Ab construct.PDF](#) (*English*)

? [\[HTML\] Development of event-specific detection method for identification of insect resistant NIBGE-1601 cotton harboring double gene Cry1Ac-Cry2Ab construct](#) (*English*)

Additional Information

Additional Information

Please note that the GenBank sequence contains an additional cassette (*epsps*) that is not present in the NIBGE-1601 cotton line.

Other relevant website addresses and/or attached documents

? [Development of event-specific detection method for identification of insect resistant NIBGE-1601 cotton harboring double gene Cry1Ac-Cry2Ab construct.pdf](#) (*English*)

? [Development and evaluation of double gene transgenic cotton lines expressing Cry toxins for protection against chewing insect pests.pdf](#) (*English*)

? [GenBank - Synthetic construct EPSPS, Cry2Ab, and Cry1Ac genes, complete cds](#) (*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.

**Secretariat of the Convention
on Biological Diversity**

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