

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-261453-2

Decisions on the LMO Risk Assessments

LAST UPDATED: 25 AUG 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.



CTC-75064-3
Insect-resistant sugarcane

<https://bch.cbd.int/database/record?documentID=261453>



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 sugarcane

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Transformation event

CTC75064-3

Does this LMO have a unique identifier?

Yes

Unique identifier

CTC-75064-3

Developer(s)

- **ORGANIZATION:** CTC - CENTRO DE TECNOLOGIA CANAVIEIRA | [BCH-CON-SCBD-243818-1](#)

ORGANIZATION:

CTC - Centro de Tecnologia Canavieira
Regional economic integration organization
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Description

The sugarcane (*Saccharum officinarum*) was transformed using *Agrobacterium*-mediated transformation for resistance to cane borer (*Diatraea saccharalis*) through the expression of *Bacillus thuringiensis cry1Ac*. The sugarcane additionally contains an *Escherichia coli* neomycin phosphotransferase II cassette, which allowed for kanamycin selection during transformation. The genetic background of CTC75064-3 is cultivar RB867515.

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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-115592-1](#) ORGANISM | SACCHARUM OFFICINARUM L. - SUGARCANE, SUGAR CANE

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

Variety RB867515

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Related LMO(s)

[BCH-LMO-SCBD-259285-2](#) | CTC-95019-5 - Insect-resistant sugarcane | Dr Wladecir Salles Oliveira | Resistance to antibiotics (Kanamycin), Resistance to diseases and pests (Insects, Lepidoptera (butterflies and moths)), Selectable marker genes and reporter genes

Characteristics of the modification process

Vector

pCTC523

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Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct

V-RB-RHIRD
0.000 kb

T-35S-CaM
0.000 kb

CS-cry1Ac-BA
0.000 kb

I-1_act1-OF
0.000 k

L-cab-WF
0.000 kb

P-e35S-CaMV
0.000 kb

P-ubi1-MAIZE
0.000 kb

CS-nptII-ECOLX
0.000 kb

T-nos-RHIRD
0.000 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-14986-6](#) CRY1AC | BACILLUS THURINGIENSIS - BT, BACILLUS, BACTU | Protein coding sequence | Resistance to diseases and pests (Insects, Lepidoptera (butterflies and moths))

BCH-GENE-SCBD-101416-6 TI PLASMID RIGHT BORDER REPEAT |

Plasmid vector

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

Terminator

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

Intron

BCH-GENE-SCBD-100354-6 5' UNTRANSLATED LEADER FROM CHLOROPHYLL A/B-BINDING PROTEIN | (WHEAT) |

Leader sequence

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

Promoter

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

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-101415-9 TI PLASMID LEFT BORDER REPEAT |

Plasmid vector

Notes regarding the genetic elements present in this LMO

The modified sugarcane contains two gene cassettes: *Bacillus thuringiensis cry1Ac* and *Escherichia coli* neomycin phosphotransferase (*nptII*).

The *cry1Ac* coding sequence is under control of the a *Cauliflower mosaic virus* (CaMV) 35S promoter (with a duplicated enhancer region) and a CaMV 35 terminator. Additionally, an 5' untranslated leader from chlorophyll a/b-binding leader sequence and *Oryza sativa* actin intron 1 were added to enhance gene expression. Due to the additional untranslated sequences and the enhanced promoter, high levels of transcription are expected to occur in all plant tissues.

The *nptII* coding sequence is under control of a *Zea mays* ubiquitin 1 promoter and *Agrobacterium tumefaciens* nopaline synthase terminator. Due to the constitutive nature of the promoter, high levels of expression are expected to occur in all plant tissues.

Note:

- The DNA integrated into the genome of event CTC75064-3 was characterized using several methodologies. The number of copies of heterologous genes was previously estimated by means of quantitative real-time PCR (qPCR). The results indicated that the sugarcane genome contains a single copy of the insert, as well as a single copy of both *cry1Ac* and *nptII* genes. No integration of vector backbone sequences were detected. Southern blot analysis using probes homologous to the *cry1Ac* gene and *nptII* gene sequences supported the qPCR results and also indicated the absence of partial integration of T-DNA elements at other sites in the

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genome of the CTC75064-3 event. The degree of genotypic stability of the event CTC75064-3 was also verified via Southern blot methodology, which proved that the T-DNA insert remained stable over four generations of vegetative propagation representing the different crop cycles (plant-cane and ratoon-cane).

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*)

Common use(s) of the LMO

Biofuel

Feed

Food

Detection method(s)

Additional Information

See attached patent documents.

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Additional Information

Other relevant website addresses and/or attached documents

[EP3995583A1- Polynucleotides, primers, and methods for detection of transgenic event, genetic construct, kit for detection material from a plant sample, event ctc75064-3, insect-resistant sugarcane plant, and method for producing an insect-resistant sugarcane plant, plant cell, plant part or seed \[English \]](#)

[EP3995583A1 - event ctc75064-3.pdf \[English \]](#)

[CropLife Brazil - CTC-75064-3 \[Portuguese \]](#)

[BCH-LMO-SCBD-261453-2](#)

Further Information

Questions about the Cartagena Protocol on Biosafety or the operation of the Biosafety Clearing-House may be directed to

**Secretariat of the
Convention on Biological**

the Secretariat of the Convention on Biological Diversity.

Diversity

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