

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-259218-1

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

LAST UPDATED: 11 FEB 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.



IND-10015-7
Chymosin-producing safflower

CBD

<https://bch.cbd.int/database/record?documentID=259218>



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

Name

Chymosin-producing safflower

EN

Transformation event

IND-10015-7

Unique identifier

IND-10015-7

Developer(s)

- [ORGANIZATION: INDEAR S.A.](#) | [BCH-CON-AR-243704-1](#)

ORGANIZATION

INDEAR S.A.

Rosario

Argentina

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Description

The safflower (*Carthamus tinctorius* L.) was modified for the production of *Bos taurus* chymosin in seed tissues. The enzyme is used in the production of cheese products to coagulate (clot) milk. In addition to the production of the enzyme, the safflower expresses *Streptomyces viridochromogenes* phosphinothricin N-acetyltransferase for glufosinate selection during transformation.

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-112725-1 ORGANISM | CARTHAMUS TINCTORIUS (SAFFLOWER, CARTI) |

Crops

Related LMO(s)

BCH-LMO-SCBD-259217-1 | IND-10003-4 - Chymosin-producing safflower | INDEAR S.A. | Resistance to herbicides (Glufosinate), Selectable marker genes and reporter genes, Use in industrial applications

Characteristics of the modification process

Vector

pSBS2165

EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct

V-RB-RHIRD
0.000 kb

P-phas-PHAVU
0.000 kb

TP-pr_r-TOBAC
0.000 kb

CS-cym-BOVIN
0.000 kb

T-phas
0.000 kb

P-Pcubi4-2
0.000 kb

CS-pat-STRVR
0.000 kb

T-ubi4_2-PETCR
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-101416-6 TI PLASMID RIGHT BORDER REPEAT |

Plasmid vector

BCH-GENE-SCBD-259197-1 PHASEOLIN PROMOTER | PHASEOLUS VULGARIS (STRING BEAN, FRENCH BEAN, KIDNEY BEAN, COMMON BEAN , PHAVU) |

Promoter

BCH-GENE-SCBD-259199-1 PATHOGENESIS-RELATED PROTEIN R TRANSIT PEPTIDE | NICOTIANA TABACUM (TOBACCO, TOBAC) |

Transit signal

BCH-GENE-SCBD-259200-1 CHYMOSIN | BOS TAURUS - COW, CATTLE, BULL, AUROCH, OXEN, BULLOCKS |

Protein coding sequence | Use in industrial applications

BCH-GENE-SCBD-259201-1 UBIQUITIN TERMINATOR | PETROSELINUM CRISPUM - PARSLEY |

Terminator

BCH-GENE-SCBD-115654-2 UBIQUITIN 4-2 PROMOTER - PETROSELINUM CRISPUM - PARSLEY |

BCH-GENE-SCBD-15002-4 PHOSPHINOTHRICIN N-ACETYLTRANSFERASE GENE |

Protein coding sequence | Resistance to herbicides (Glufosinate)

[BCH-GENE-SCBD-101415-9](#) TI PLASMID LEFT BORDER REPEAT |

Plasmid vector

[BCH-GENE-SCBD-104364-1](#) PHASEOLIN 3' TERMINATOR | (STRING BEAN, FRENCH BEAN, KIDNEY BEAN, COMMON BEAN) |

Terminator

Notes regarding the genetic elements present in this LMO

The modified safflower contains two gene cassettes: *Bos taurus* chymosin (*cym*) and *Streptomyces viridochromogenes* phosphinothricin N-acetyltransferase (*pat*).

The *cym* coding sequence is under control of the *Phaseolus vulgaris* phaseolin promoter and terminator. The coding sequence additionally contains a pathogenesis-related protein R transit peptide, which will direct the CYM protein to the apoplast of seed tissues. Expression of the *cym* coding sequence is expected to be restricted to seed tissues.

The *pat* coding sequence is under control of the *Petroselinum crispum* ubiquitin promoter and terminator. Due to the constitutive nature of the promoter, high levels of transcription are expected.

EN

Note:

- Southern blot indicated that the genome contains a single T-DNA insertion.
- Sequencing and PCR analyses indicated that the sequences are intact and without rearrangements.
- Sequencing analysis additionally indicated that no vector backbone sequences were integrated into the safflower genome.

LMO characteristics

Modified traits

Resistance to herbicides

Glufosinate

Use in industrial applications

Enzyme production

Selectable marker genes and reporter genes

Common use(s) of the LMO

Pharmaceutical

Additional Information

Other relevant website addresses and/or attached documents

? [Euginius - IND-10015-7 safflower](#) (English)

? [DD exp 38916_16 Cártamo firmado 27 04 17.pdf](#) (English)

? [CA2381438C - Commercial production of chymosin in plants.pdf](#) (*English*)

[BCH-LMO-SCBD-259218-1](#)

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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