

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)

BCH-LMO-SCBD-103098-6

EN


DE

Decisions on the LMO Risk Assessments

LAST UPDATED: **12 MAR 2024**


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.



Potato synthesizing cyanophycin biopolymer

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=103098>


Name

Potato synthesizing cyanophycin biopolymer

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Transformation event

PsbY-cyel lines 12 and 23

Does this LMO have a unique identifier?

No

Developer(s)

- **ORGANIZATION:** UNIVERSITY OF ROSTOCK | [BCH-CON-DE-48069-3](#)

ORGANIZATION:

University of Rostock

Academic or research institute

Agrobiotechnology - Faculty of Agricultural and Environmental Sciences

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Description

The LMO PsbY-cye1 synthesizes the biopolymer cyanophycin which is a polyaspartate that finds broad application as a construction chemical and in the detergent industry. Through production of cyanophycin within potato plants a fully degradable substitute for petrochemical plastics should be provided.

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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-12106-6](#) | Organism | Solanum tuberosum (Potato, SOLTU)
Crops

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

Solanum tuberosum, variety Albatros

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Characteristics of the modification process

Vector

derivate of pLH9000, pLH9000/PsbY-cye1

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Techniques used for the modification

Agrobacterium-mediated DNA transfer

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-100287-7](#) | CaMV 35S promoter | Cauliflower mosaic virus (CaMV)
Promoter

[loading record details...](#)

[BCH-GENE-SCBD-103097-4](#) | PsbY transit peptide | Spinacia oleracea (Spinach, SPIOL)
Transit signal

[loading record details...](#)

[BCH-GENE-SCBD-103096-2](#) | Cyanophycin synthetase | Thermosynechococcus elongatus (Cyanobacteria)
Protein coding sequence | Use in industrial applications

[BCH-GENE-SCBD-100290-6](#) | CaMV 35S terminator | Cauliflower mosaic virus (CaMV)
Terminator

[loading record details...](#)

[BCH-GENE-SCBD-15001-5](#) | Neomycin Phosphotransferase II | Escherichia coli (ECOLX)
Protein coding sequence | Resistance to antibiotics (Kanamycin)

Notes regarding the genetic elements present in this LMO

The LMO PsbY-cyel expresses the cyanophycin synthetase cyel as a fusion protein together with the transit peptide PsbY. Therefore the enzyme cyel is translocated to the plastids of leaves and potato tubers of transgenic potato plants. The CaMV 35S promoter mediates an ubiquitous expression, the T-35S terminates the transcription of the fusion protein.

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As a selection marker system the nptII gene was put under the control of the CaMV 35S promotor and -terminator. The gene product aminoglycosid 3'-phosphotransferase II catalyzes the phosphorylation of some aminoglycoside antibiotics, thereby inactivating these.

LMO characteristics

Modified traits

Resistance to antibiotics

Kanamycin

Neomycin

Use in industrial applications

Common use(s) of the LMO

Fiber/textile (production of a biopolymer)

Detection method(s)

Additional Information

PCR-based methods, to be developed on information about the transformation vector.

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Additional Information

Other relevant website addresses and/or attached documents

[Production of cyanophycin, a suitable source for the biodegradable polymer polyaspartate, in transgenic plants \[English \]](#)

[Isolation of cyanophycin from tobacco and potato plants with constitutive plastidic cphA\(Te\) gene expression \[English \]](#)

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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.

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Convention on Biological
Diversity**

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