

Biosafety Clearing-House (BCH)

LIVING MODIFIED ORGANISM (LMO)


BCH-LMO-SCBD-14858-5

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

LAST UPDATED: 06 MAY 2013


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.



ACS-OS001-4
Liberty Link™ rice

<https://bch.cbd.int/database/record?documentID=14858>



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

Name

Liberty Link™ rice

EN

Transformation event

LLRICE06

Unique identifier

ACS-OS001-4

Developer(s)

- **ORGANIZATION:** BAYER CROPSCIENCE | [BCH-CON-SCBD-7088-7](#)

ORGANIZATION

Bayer CropScience

Website: <http://www.bayercropscience.com>

Description

Rice resistant to the herbicide glufosinate through introduction of the bar gene from *Streptomyces hygroscopicus* which encodes the enzyme phosphinothricin-N-acetyltransferase (PAT) that catalyzes the acetylation of phosphinothricin (glufosinate), detoxifying it into an inactive compound.

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-10454-5 ORGANISM | ORYZA SATIVA (RICE, ORYSA) |

Crops

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

Variety: M202

EN

Related LMO(s)

BCH-LMO-SCBD-14859-7 | ACS-OS002-5 - Liberty Link™ rice | Resistance to herbicides - Glufosinate
[Show detection method\(s\)](#)
BCH-LMO-SCBD-47517-6 | BCS-OS003-7 - Liberty Link™ rice | Bayer CropScience (Aventis CropScience (AgrEvo)) | Resistance to herbicides (Glufosinate)
[Show detection method\(s\)](#)

Characteristics of the modification process

Vector

pB5/35Sbar

EN

Techniques used for the modification

Direct DNA transfer

Genetic elements construct

P-35S-CaMV 0.531 kb	CS-bar-STRHY 0.551 kb	T-35S-CaMV 0.193 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-14972-12 PHOSPHINOTHRICIN N-ACETYLTRANSFERASE GENE |

Protein coding sequence | Resistance to herbicides (Glufosinate)

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

Promoter

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

Terminator

Notes regarding the genetic elements present in this LMO

The phosphinothricin-N-acetyltransferase enzyme coding sequence was obtained from the *Streptomyces hygroscopicus* HP632 strain. The N-terminal codon of the wild type gene was modified to and ATG.

Southern blot analysis indicated that there is at least one intact copy of the transformation cassette and several partial/ incomplete copies integrated into the host genome. No portions of the vector backbone were detected in the LMO.

EN

LMO characteristics

Modified traits

Resistance to herbicides
Glufosinate

Common use(s) of the LMO

Food

Additional Information

Additional Information

Rice lines LLRICE06 and LLRICE62 were genetically engineered to express tolerance to glufosinate ammonium, the active ingredient in phosphinothricin herbicides (Basta®, Rely®, Finale®, and Liberty®). Glufosinate chemically resembles the amino acid glutamate and acts to inhibit an enzyme, called glutamine synthetase, which is involved in the synthesis of glutamine. Essentially, glufosinate acts enough like glutamate, the molecule used by glutamine synthetase to make glutamine, that it blocks the enzyme's usual activity. Glutamine synthetase is also involved in ammonia detoxification. The action of glufosinate results in reduced glutamine levels and a corresponding increase in concentrations of ammonia in plant tissues, leading to cell membrane disruption and cessation of photosynthesis resulting in plant withering and death.

Glufosinate tolerance in these rice lines is the result of introducing a gene encoding the enzyme phosphinothricin-N-acetyltransferase (PAT) isolated from the common aerobic soil actinomycete, *Streptomyces hygroscopicus*, the same organism from which glufosinate was originally isolated. The PAT enzyme catalyzes the acetylation of phosphinothricin, detoxifying it into an inactive compound. The PAT enzyme is not known to have any toxic properties. The PAT encoding gene (bar) was introduced into the rice genome by direct gene delivery transformation, and the resulting rice lines displayed field tolerance to phosphinothricin-containing herbicides.

Other relevant website addresses and/or attached documents

? [ACS-OS001-4 - OECD](#) (English)

[ACS-OS001-4 - CERA](#) (English)

? [Liberty Link rice.pdf](#) (English)

[BCH-LMO-SCBD-14858-5](#)

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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