

Biosafety Clearing-House (BCH)

GENETIC ELEMENT (GENE)

BCH-GENE-SCBD-14972-12

LAST UPDATED: 14 APR 2015

General information

Name of genetic element

Phosphinothricin N-acetyltransferase gene

EN

Alternate genetic element name(s) (synonym(s))

Bialaphos resistance gene

EN

Abbreviation

CS-bar-STRHY

EN

Category

Protein coding sequence

Is this genetic element a synthetic molecule?

No

Donor organism

Donor organism(s)

[BCH-ORGA-SCBD-12103-4](#) ORGANISM | STREPTOMYCES HYGROSCOPICUS (STRHY) |

Bacteria

Characteristics of the protein coding sequence

Name of the protein expressed by the coding sequence

Phosphinothricin N-acetyltransferase (PAT)

EN

Biological function of the protein

The glufosinate ammonium tolerance gene (*bar* gene), derived from the common soil bacterium *Streptomyces hygroscopicus*, codes for phosphinothricin acetyltransferase (PAT) and leads to increased tolerance to herbicides containing glufosinate ammonium, such as 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 blocks the activity of glutamine synthetase by mimicking the enzyme's substrate

EN

glutamate which is used to produce glutamine. 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.

Phosphinothricin N-acetyltransferase (PAT) acts by catalyzing the acetylation of glufosinate (phosphinothricin) so that it no longer inhibits the enzyme glutamine synthase and, thus, eliminating its herbicidal activity.

Related trait(s) or use(s) in biotechnology

Resistance to herbicides
Glufosinate

Additional Information

Similar to GENBANK accession X05822 (see link below).

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Other relevant website addresses and/or attached documents

? [GENBANK accession X05822](#) (*English*)

? [Characterization of the herbicide-resistance gene bar from Streptomyces hygroscopicus.pdf](#) (*English*)

[BCH-GENE-SCBD-14972-12](#)

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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