

Biosafety Clearing-House (BCH)

GENETIC ELEMENT (GENE)

BCH-GENE-SCBD-14979-7

LAST UPDATED: 12 FEB 2021

General information

Name of genetic element

5-enolpyruvylshikimate-3-phosphate synthase gene

EN

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

CP4-epsps

EN

aroA

EN

3-phosphoshikimate 1-carboxyvinyltransferase

EN

Abbreviation

CS-CP4epsps-RHIRD

EN

Category

Protein coding sequence

Is this genetic element a synthetic molecule?

No

Donor organism

Donor organism(s)

[BCH-ORGA-SCBD-12081-6](#) ORGANISM | AGROBACTERIUM TUMEFACIENS (AGROBACTERIUM) |
Bacteria

Point of collection or acquisition of the donor organism(s)

Agrobacterium tumefaciens strain CP4

EN

Characteristics of the protein coding sequence

Name of the protein expressed by the coding sequence

5-enolpyruvylshikimate-3-phosphate synthase

EN

Biological function of the protein

The cp4 epsps gene was isolated from the CP4 strain of the common soil bacterium *Agrobacterium tumefaciens*. The enzyme encoded by the sequence is a version of EPSPS that is highly tolerant to inhibition by glyphosate and therefore leads to increased tolerance to glyphosate-containing herbicides. The following reaction is catalyzed by EPSPS:

3-phosphoshikimate + phosphoenolpyruvate = 5-O-(1-carboxyvinyl)-3-phosphoshikimate + phosphate

Glyphosate specifically binds to and inactivates the enzyme EPSPS, which is part of an important plant biochemical pathway called the shikimate pathway. The shikimate pathway is involved in the biosynthesis of the aromatic amino acids tyrosine, phenylalanine and tryptophan, as well as other aromatic compounds. When plants are treated with glyphosate herbicides they cannot produce the aromatic amino acids that are essential to their survival and, therefore, die.

LMOs containing the glyphosate-tolerant *epsps* gene allow farmers to use glyphosate-containing herbicides for weed control, which will kill the weeds but not the LMO.

EN

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

Resistance to herbicides
Glyphosate

Additional Information

Other relevant website addresses and/or attached documents

? [5—Enolpyruvylshikimate 3—Phosphate Synthase: From Biochemistry to Genetic Engineering of Glyphosate Tolerance](#) (English)

? [UniProtKB - Q9R4E4 \(AROA_AGRSC\)](#) (English)

[BCH-GENE-SCBD-14979-7](#)

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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