

Biosafety Clearing-House (BCH)

GENETIC ELEMENT (GENE)

BCH-GENE-SCBD-115828-1

LAST UPDATED: 04 DEC 2020

General information

Name of genetic element

Phytase

EN

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

Phosphoanhydride phosphorylase

EN

appA

EN

Abbreviation

phy02

EN

Category

Protein coding sequence

Is this genetic element a synthetic molecule?

No

Donor organism

Donor organism(s)

[BCH-ORGA-SCBD-14930-5](#) ORGANISM | [ESCHERICHIA COLI \(ECOLX\)](#) |
Bacteria

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

The *phy02* sequence was derived from the *E. coli* strain K12 *appA* gene. Site-directed mutagenesis was applied to introduce amino acid changes for increased thermostability and gastric digestion resilience.

EN

Characteristics of the protein coding sequence

Biological function of the protein

Phytases catalyze the removal of phosphate groups from phytate (phytic acid). The enzyme promotes the hydrolysis of the phosphoester bond, producing inositol and phosphate.

EN

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

Changes in quality and/or metabolite content

Other

Improved digestibility/digestion

Increased phosphorous bioavailability

Additional Information

Phytases are often added to animal feed to improve digestibility as plants store phosphorous in an indigestible form, phytic acid, which is considered an antinutrient (chelating iron, zinc, magnesium and calcium) and its excretion can lead to environmental phosphate pollution.

EN

Other relevant website addresses and/or attached documents

? [UniProtKB - P07102 \(PPA_ECOLI\) - Periplasmic AppA protein](#) (*English*)

? [Crystal structures of Escherichia coli phytase and its complex with phytate.pdf](#) (*English*)

? [Effect of Phytase Derived from the E. coli AppA Gene on Weaned Piglet Performance, Apparent Total Tract Digestibility and Bone Mineralization.pdf](#) (*English*)

? [WO2017049094A1\(Engineered phytases and methods of using the same\).pdf](#) (*English*)

? [GenBank - phosphoanhydride phosphorylase \[Escherichia coli B088\] \(EFE63517.1\)](#) (*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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on Biological Diversity**

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