LIVING MODIFIED ORGANISM (LMO)

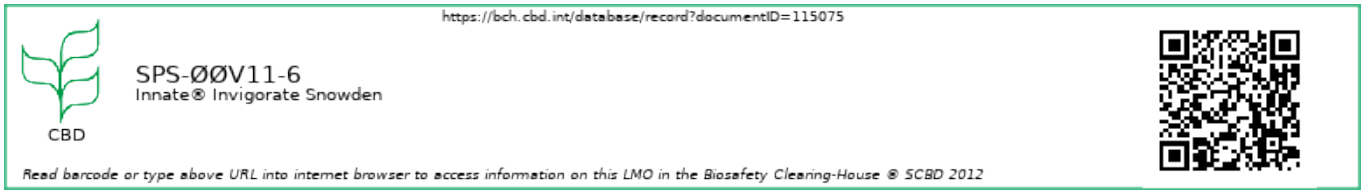
BCH-LMO-SCBD-115075-1

? Decisions on the LMO ? Risk Assessments

LAST UPDATED: 30 JUL 2019

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.



Name

Innate® Invigorate Snowden | EN

Transformation event

V11

Unique identifier

SPS-ØØV11-6

Developer(s)

- ORGANIZATION: J.R. SIMPLOT COMPANY | BCH-CON-SCBD-106427-1

ORGANIZATION

J.R. Simplot Company
Private sector (business and industry)
5369 West Irving Street
Boise, ID
83706, United States of America
Phone: +1 (208) 780-6066

Description

The potato variety Snowden was modified for reduced blackening of the tuber and decreased levels of reducing sugars through the downregulation of the endogenous asparagine synthase 1 (Asn1), water dikinase R1 (R1), starch phosphorylase L (PhL), and polyphenol oxidase 5 (PPO5) by RNA interference. Silencing of PPO5 reduces the browning and blackening of the tuber flesh. Down-regulation of R1, Asn1, and PhL decrease the | EN

concentration of reducing sugars and thus decrease the potential of acrylamide formation via the Maillard reaction.

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 var. Snowden EN

Related LMO(s)

BCH-LMO-SCBD-109054-2 | SPS-ØØF10-7 - Innate™ Ranger Russet Potato | J.R. Simplot Company | Changes in quality and/or metabolite content (Pigmentation / Coloration, Protein and amino acids)
BCH-LMO-SCBD-109055-2 | SPS-ØØF37-7 - Innate™ Ranger Russet Potato | J.R. Simplot Company | Changes in quality and/or metabolite content (Pigmentation / Coloration, Protein and amino acids)
BCH-LMO-SCBD-106428-3 | SPS-ØØE12-8 - Innate™ Russet Burbank Potato | J.R. Simplot Company | Changes in quality and/or metabolite content (Pigmentation / Coloration, Protein and amino acids)
BCH-LMO-SCBD-109053-1 | SPS-ØØE24-2 - Innate™ Russet Burbank Potato | J.R. Simplot Company | Changes in quality and/or metabolite content (Pigmentation / Coloration, Protein and amino acids)
BCH-LMO-SCBD-109057-2 | SPS-ØØJ55-2 - Innate™ Atlantic Potato | J.R. Simplot Company | Changes in quality and/or metabolite content (Pigmentation / Coloration, Protein and amino acids)

Characteristics of the modification process

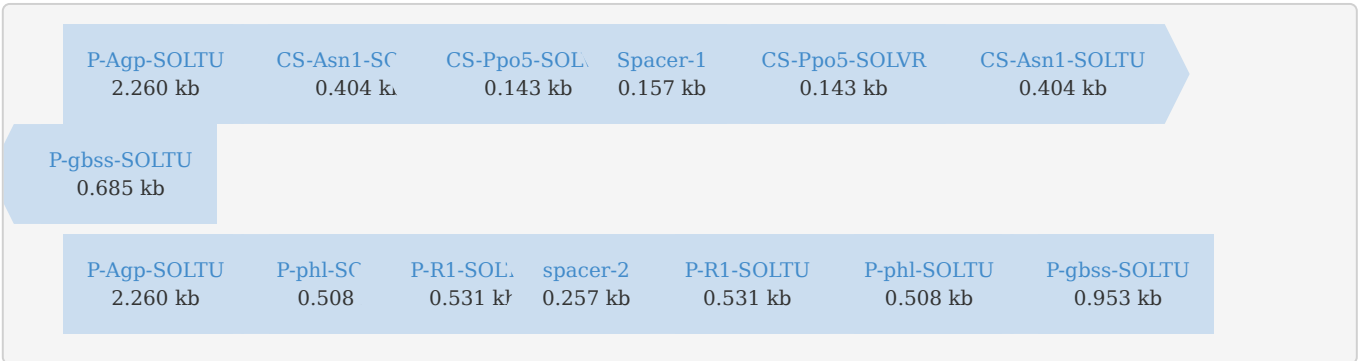
Vector

pSIM1278 EN

Techniques used for the modification

Agrobacterium-mediated DNA transfer

Genetic elements construct



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-106421-1 ASPARAGINE SYNTHETASE-1 GENE | (POTATO)
Protein coding sequence | Changes in quality and/or metabolite content (Protein and amino acids)

BCH-GENE-SCBD-106420-1 ADP GLUCOSE PYROPHOSPHORYLASE GENE PROMOTER | (POTATO)
Promoter

BCH-GENE-SCBD-14997-6 GRANULE BOUND STARCH SYNTHASE GENE PROMOTER | (POTATO)
Promoter

BCH-GENE-SCBD-106426-1 PHOSPHORYLASE-L GENE PROMOTER | (POTATO)
Promoter

BCH-GENE-SCBD-106425-1 ALPHA-GLUCAN WATER DIKINASE R1 GENE PROMOTER | (POTATO)
Promoter

BCH-GENE-SCBD-115073-1 SPACER SEQUENCE | (POTATO)
Spacer sequence

BCH-GENE-SCBD-115074-1 SPACER SEQUENCE | (POTATO)
Spacer sequence

BCH-GENE-SCBD-106424-3 POLYPHENOL OXIDASE 5 GENE | (EARTH BALLS, SCLVE)
Protein coding sequence | Changes in quality and/or metabolite content (Pigmentation / Coloration)

Notes regarding the genetic elements present in this LMO

The modified potato contains two RNA interference (RNAi) cassettes for the potato genes: asparagine synthase-1 (Asn1) - polyphenol oxidase 5 (PPO5) and phosphorylase-L (PhL) - Alpha-glucan water dikinase R1 (R1).

Asn1-PPO5:
Transcription commences from both promoters, the potato ADP glucose pyrophosphorylase promoter (P-Agp) and the potato granule bound starch synthase promoter (P-Gbss), which are in a convergent orientation relative to each other. The transcripts produced have inverted repeats of Asn1 and PPO5 segments, separated by a spacer sequence derived from the potato genome. After transcription, the transcripts form double stranded RNA (dsRNA) molecules due to the homology of the sequences. The RNA molecules are then sufficient to trigger an RNAi response.

pPhL-R1:
Transcription is also directed from the convergent promoters P-Agp and P-Gbss. The RNA molecules contain inverted repeats of the promoter segments of PhL and R1, as well as a spacer derived from the potato genome. Post-transcription, the RNA molecules can form double stranded structures due to the sequence homology within the transcripts and trigger an RNAi response.

Note:
- The promoters are tuber-specific and expected to be most active in the tuber tissue.
- The transcripts are not expected to be translated into proteins.
- No specific terminators were added to the cassettes and thus the transcripts are not expected to have poly(A) tails.
- No marker genes (e.g. kanamycin or hygromycin resistance) are present.
- Southern blotting confirmed that the V11 genome contains a single T-DNA insertion.
- No vector backbone was incorporated into the V11 genome.

EN

LMO characteristics

Modified traits

Changes in quality and/or metabolite content
Pigmentation / Coloration
Protein and amino acids

How the expression of the gene(s) was affected

Due to the formation of the dsRNA structures, RNA interference is triggered. The dsRNA is processed into small interfering RNA (siRNA), which can direct degradation of transcripts that share homology to the siRNA. The degradation of the endogenous mRNA results in the silencing of gene expression of the following endogenous genes: Asn1, PPO5, PhL, and R1.	EN

Common use(s) of the LMO

Food

Additional Information

Other relevant website addresses and/or attached documents

? Patent - V11 potato (WO2016183445A1).pdf *(English)*

? APHIS: Extended Determination of Nonregulated Status for JR Simplot Company Innate V11 Potatoes (15_14001p_det).pdf *(English)*

BCH-LMO-SCBD-115075-1

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
413 rue Saint-Jacques, suite 800
Montreal, Québec, H2Y 1N9
Canada
Fax: +1 514 288-6588
Email: secretariat@cbd.int