LIVING MODIFIED ORGANISM (LMO)

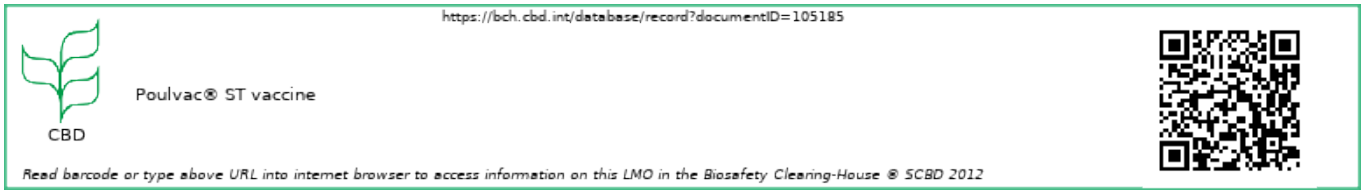
BCH-LMO-SCBD-105185-1

? Decisions on the LMO ? Risk Assessments

LAST UPDATED: 15 JAN 2014

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

Poulvac® ST vaccine | EN

Transformation event

STM-1

Developer(s)

- PERSON: DR MATUSALEM PEREIRA SANTOS | BCH-CON-SCBD-105178-2

PERSON

Dr Matusalem Pereira Santos
President Of CIBio, Zoetis Indústria de Produtos Veterinários Ltda
Rua Luis Fernando Rodriguez, 1701 Vila Boa Vista
Campinas, São Paulo
13064798, Brazil
Phone: +55 19 37456240
Fax: +55 19 37456189
Email: elianaaguiar@cdn.com.br
Website: http://www.zoetis.com.br/index.br

RELATED ORGANIZATION

Description

Poulvac ST modified-live vaccine aids in the reduction of Salmonella enteritidis, Salmonella heidelberg and Salmonella typhimurium colonization | 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-45768-4 ORGANISM | SALMONELLA TYPHIMURIUM (SALTM)
Bacteria

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

The receipient organism was isolated from a poultry virulent form of Salmonella typhimurium, strain 82/6915, which was isolated from a chicken in Victoria, Australia in 1982	EN

Characteristics of the modification process

Vector

Enterobacteria phage P22	EN

Techniques used for the modification

Other (Bacteriophage Transduction)

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-105184-2 5-ENOLPYRUVYLSHIKIMATE-3-PHOSPHATE SYNTHASE GENE | (BACTERIA)
Protein coding sequence | Changes in quality and/or metabolite content (Protein and amino acids)

BCH-GENE-SCBD-105183-2 PHOSPHOSERINE AMINOTRANSFERASE GENE | (BACTERIA)
Protein coding sequence | Changes in quality and/or metabolite content (Protein and amino acids)

Notes regarding the genetic elements present in this LMO

The genetic modification of the poultry virulent form of S. typhimurium strain 82/6915, was performed using enterobacteria phage P22 transduction of a DNA vector containing the S. typhimurium LT2 aroA554::Tn10 transposon originating from strain 1545. The insertion site of the transposon Tn10 is in the aroA-serC operon. aroA specifies the enzyme 3-enolpyruvylshikimate-5-phosphate synthetase. Strains contining this transposon cannot grow on chemically defined media unless provided with the essential metabolites derived from chorismic acid, i.e. the aromatic amino acids tyrosine, phenylalanine, and tryptophan and two minor aromatic metabolites, p-aminobenzoate, needed as a precursor of folic acid, and 2,3-dihydroxybenzoic acid, as a precursor of the iron-chelating compound enterobactin (enterochelin). serC encodes phosphoserine aminotransferase, an enzyme in the biosynthesis of serine. Insertion of the transposon also imparts tetracycline resistance. Transduction of the receipient strain S. typhimurium 82/6915 was carried out in the presence of tetracycline supplemented medium. Transductant clones that were found to be resistant to tetracycline were selected. Colonies were isolated and further screened for loss of tetracycline resistance. The isolation of tetracycline-sensitive variants is facilitated by the fact that tetracycline, at appropriate	EN

concentrations, prevents multiplication of tetracycline-sensitive bacteria, but does not kill them, whereas penicillin kills multiplying bacteria but spares non-multiplying bacteria. The technique of penicillin-selection was used for isolation of tetracycline-sensitive variants.

A tetracycline-sensitive mutant that remained auxotrophic for aromatic metabolites and serine was identified. The resulting S. typhimurium strain 82/6915 aroA-serC deletion mutant, was denominated as strain STM-1.

The requirement for aromatic metabolites and serine,is not met when S. typhimurium is present in vertebrate tissues, resulting in retardation of growth in vivo or outside the host. Deficient lineages of this modified-live vaccine remain in host tissue for several days, but without causing symptoms and eventually be eliminated by immunological defence mechanisms while still imparting protection against salmonella.

LMO characteristics

Modified traits

Production of medical or pharmaceutical compounds (human or animal)
Vaccines

Common use(s) of the LMO

Vaccine

Additional Information

Other relevant website addresses and/or attached documents

? Poulvac® ST - Zoetis *(English)*

? Technical Report No 2741/2010 - Commercial Release of Genetically Modified Organism Called Poulvac ST – a live vaccine against Salmonella typhimurium - CTNBio *(English)*

? Genes aroA and serC of Salmonella typhimurium constitute an operon. *(English)*

? Aromatic-dependent Salmonella typhimurium are non-virulent and effective as live vaccines *(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.

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