Definitions

Food produced using gene technology means a food which has been derived or developed from an organism which has been modified by gene technology.

Gene technology means recombinant DNA techniques that alter the heritable genetic material of living cells or organisms

Techniques

Agroinfiltration
Cisgenesis
Intragenesis
Transgenesis/GM Rootstock grafting
RNA interference/RNA-dependent DNA Methylation

Transgenic-assisted breeding:
- Speed breeding
- Reverse breeding
- Seed Production Technology

Gene editing:
- SDN-1
- SDN-2
- SDN-3
- ODM

SDN = site directed nuclease that introduces a double-stranded DNA break:
- Zinc finger nuclease (ZFN) – DNA targeting sequence is a protein
- Transcription activator-like effector nuclease (TALEN) – DNA targeting sequence is a protein
- Clustered regularly interspaced short palindromic repeats (CRISPR) coupled with Cas9 nuclease (CRISPR/Cas9) – DNA targeting sequence is RNA

DNA coding for a nuclease will involve recombinant DNA

- SDN-1 – deletions, point mutations, small insertions; the DNA break is repaired naturally
- SDN-2 – deletions, point mutations, small insertions; the DNA break is repaired by the addition of a template
- SDN-3 – involves a large insertion (e.g. a whole gene). The DNA break is repaired by the addition of a template

Have recombinant DNA techniques been used at any stage?

NO

Agroinfiltration (somatic cells)
SDN-1 (nuclease added as protein)
SDN-2 (nuclease added as protein; template added as an oligo)
ODM

Not captured by Standard 1.5.2

YES (all broadly regarded as ***transgenic***)

Agroinfiltration (germ cells)
Cisgenesis/Intragenesis
Transgenesis/GM Rootstock grafting
RNAi/RdDM
Transgenic-assisted breeding
SDN-1 (DNA coding for nuclease)
SDN-2 (DNA coding for nuclease &/or template)
SDN-3 (DNA coding for nuclease &/or template + foreign gene)

Has the recombinant DNA been segregated away in the final organism from which the food will be derived?

NO

Agroinfiltration (germ cells)
Cisgenesis/Intragenesis
Transgenesis/Rootstock grafting
RNAi
SDN-3

Captured by Standard 1.5.2

YES (referred to as null segregants)

RdDM
SDN-1
SDN-2
Transgenic-assisted breeding

Not captured by Standard 1.5.2

Technical considerations

Recombinant DNA is DNA that has been prepared *in vitro* and then added to the organism being modified.

Recombinant DNA techniques are those that result in the presence of recombinant DNA in the genome of the organism being modified to produce a recombinant organism.

In the definition for ***Food produced using gene technology*** the term ***derived or developed from*** relates specifically to the final organism that directly bears the food.

Therefore the outcome of the use of ***gene technology*** is the presence of recombinant DNA in the genome of the final organism that directly bears the food. Small gene edits and deletions not considered to result in recombinant DNA.