

Advisory Committee on Releases to the Environment Advice

Advice on the precision bred status of organisms described within a precision breeding marketing notice

Precision Breeding Marketing Notice Reference: PBM/26/MUAC/001

Date: March 2026

Notice summary: A precision breeding marketing notice describing a gene edited banana plant (*Musa acuminata*) where CRISPR-Cas9 has been used to create an indels in three alleles of the Polyphenol Oxidase 1 (*PPO1*) gene. The resulting phenotype is a banana plant with reduced fruit browning.

Advice of the Advisory Committee on Releases to the Environment (ACRE) under section 7 of the Genetic Technology (Precision Breeding) Act 2023 to the Secretary of State for Environment, Food and Rural Affairs.

ACRE considers the organisms described within the referenced marketing notice **to be precision bred**, based on the definition of a precision bred organism outlined in Section 1.2 of the Genetic Technology (Precision Breeding) Act 2023.

Overview

ACRE has assessed the information provided in this marketing notice against the definition of a precision bred organism outlined in Section 1.2 of the Genetic Technology (Precision Breeding) Act (the act). ACRE's advice is as follows:

‘(a) Any feature of its genome results from the application of modern biotechnology’

The banana plant has a number of small indels within all three alleles of the nuclear Polyphenol Oxidase 1 (*PPO1*) gene in chromosome 6 of the nuclear banana genome resulting from the application of a site-directed endonuclease (CRISPR-Cas9) and two specific guide RNAs introduced *via. Agrobacterium* mediated transient transformation. This is a technique of modern biotechnology as defined by the act.

‘(b) Every feature of its genome that results from the application of modern biotechnology is stable’

Due to the asexual reproduction of bananas, the edits made to the banana plant are stable, and its progenies are expected to retain the targeted DNA edits during propagation. Molecular characterisation of subsequent generations by the notifier confirmed this stability.

‘(c) Every feature of its genome that results from the application of modern biotechnology could have resulted from traditional processes, whether or not in conjunction with selection techniques, alone’

The transformation of the banana plant with CRISPR-Cas9 and two specific guide RNAs is accepted to have resulted in small indels within all three alleles of the *PPO1* gene resulting in gene knock-out and a protein loss-of-function. These edits in the targeted gene are genetic changes that could have resulted from traditional processes as defined in the act. The committee requested more information from notifier as to the methods used to search for any off-target effects and was satisfied by their response that sufficient steps were taken by the notifier in this regard.

‘(d) Its genome does not contain any feature that results from the application of any artificial modification technique other than modern biotechnology’

The banana plant does not contain any feature within its genome made by artificial modification techniques, other than modern biotechnology. To confirm this, the notifier analysed the guide RNAs and a banana genome sequence and conducted PCR analysis and whole-genome sequencing of the reduced-browning banana plants. The presence of indels in the target genes and absence of plasmid-derived sequences confirmed that only genetic sequences that could occur through traditional processes were present.

Therefore, based on the information provided within the referenced marketing notice, ACRE considers this plant to be precision bred.