



ROTHAMSTED  
RESEARCH

# Precision-Bred Crops for a Sustainable Bioeconomy

## *Gene-edited Camelina with enhanced seed oil composition*

Camelina is a member of the Brassica family and an established oilseed crop. Camelina seed oil is nutritious and suitable for either feed or food; seed products can be used in both terrestrial and aquaculture applications, supporting high-value biobased economic activity. Recently, Camelina has attracted attention from policy makers and growers because of its ability to support more resilient and sustainable food systems. Camelina is attractive because it is resistant to major pests (cabbage stem flea beetle), has low input costs and survives unpredictable growing conditions.

We have used CRISPR-Cas9 gene editing to improve several different traits, generating precision-bred camelina that should be more attractive crop for UK farmers. To do this we have field tested the following changes:

1. Improved seed oil composition (editing the FAE1 gene), removing monounsaturates and making a healthy oil rich in omega-3s.
2. Enhanced seed processing and digestibility (editing the TT2 gene), removing the oxidized flavonoid known as proanthocyanidin from the seed coat. This makes seed processing less energy-intensive and boosts overall seed oil content.

Commercial growers expect to have access to modern crop protection products, including herbicides to suppress weeds in crops. We can achieve this in Camelina using cisgenesis (which is classified as a form of Precision Breeding) to generate plants that are tolerant to herbicides typically used to protect Brassica species. This will make Camelina easier to grow by UK farmers and enable its use as a valuable break crop in arable rotations.

Rothamsted Research believes that Precision-Bred Camelina represents an exciting and economically viable option for both producers and end-users.



Biotechnology and  
Biological Sciences  
Research Council

For more information visit the Rothamsted Research  
website or email Professor Johnathan Napier  
([Johnathan.napier@rothamsted.ac.uk](mailto:Johnathan.napier@rothamsted.ac.uk))

