Supercharged safflower

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This is a super-high oleic safflower. Credit: CSIRO

This scientific achievement has produced safflower seed oil that contains more than 90 per cent of this valuable fatty acid, the highest level of purity of an individual fatty acid currently available in any plant oil.

The new safflower type will provide Australian grain growers with a unique opportunity to produce and supply renewable, sustainable plant oils that will replace petroleum-based feedstocks in the manufacture of industrial products.

The future global demand for high purity oleic acid oil could require over 100,000 hectares of this 'super-high' oleic safflower, which is comparable to the size of the cotton industry in Australia.

Dr Allan Green, Deputy Chief of CSIRO Plant Industry, said this breakthrough safflower oil combines high-purity for industrial chemical production with tremendous stability for direct use in industrial lubricants and fluids, creating a versatile, valuable industrial raw material. "Plant oils contain a range of fatty acids including both monounsaturates and polyunsaturates," Dr Green said.

"For food use it's important to have a healthy balance of these. However, the polyunsaturates cause problems for industrial use because they are unstable and difficult to remove during oil processing," he said.

Dr Green said the team used CSIRO gene silencing technology to boost the level of desirable oleic acid in the seed by switching off its conversion to the undesirable polyunsaturates.

"We have succeeded in dramatically lowering the polyunsaturates to below three per cent, thereby raising the monounsaturate oleic acid to over 90 per cent purity," Dr Green said.

This new 'super-high' oleic safflower was developed by the Crop Biofactories Initiative, a strategic research and product development partnership between CSIRO and the Grains Research and Development Corporation (GRDC).

Dr Jody Higgins, Senior Manager Commercial Grain Technologies at the GRDC, said the breakthrough development could create a new crop industry in Australia, initially suitable for farmers in northern NSW and southern Queensland.

"Safflower is an old crop known from ancient times, but it is very minor crop in Australia today because of the low local demand for its current oil quality type," Dr Higgins said.

"Interestingly, safflower was originally grown in Australia as an industrial crop where the oil was used to make paints and resins," she said.

Safflower is ideal for Australian biofactories as it is a very hardy and adaptable crop that does well in warm-season conditions and should cope well with the expected stresses of climate change.

"Our market intelligence has shown that global demand for high purity oleic acid oil could require over 100,000 hectares of 'super-high' oleic safflower, which is comparable to the size of the cotton industry in Australia," Dr Higgins said.

"The Crop Biofactories Initiative will engage in further discussions with a number of local and international companies to develop production of this high value safflower crop in Australia," she said.

'Super-high' oleic safflower will also provide a core technology platform for the future development of a range of oils with high contents of industrially-important derivatives of oleic acid.

Provided by CSIRO