Australia's newest biotech crop–Super high oleic safflower oil, a sustainable plant oil to replace industrial uses of petroleum and palm-based oils

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Abstract

Safflower (*Carthamus tinctorius* L.) seed produces oil that predominantly contain monounsaturated fatty acid (C18:1; oleic acid) and polyunsaturated fatty acid (C18:2; linoleic acid). While both have commercial uses, it is the valuable oleic acid that is used as a replacement to petroleum-based precursors in the manufacture of plastics, lubricants and cosmetics, etc. Traditional breeding programs have developed safflower seed with oleic acid levels in the range of 75–85% and are the highest purity sources of oleic acid in any oilseed. However, like other oilseeds, the remaining linoleic acid component, at 12-18%, is not desirable for industrial use because it is unstable and difficult to remove during oil processing. Therefore, it is desirable to develop a safflower seed that accumulates high oleic acid (C18:1) but contains very low linoleic acid (C18:2) content.

Two genetically modified safflower events (OECD Unique IDs: GOR-73226-6 and GOR-7324Ø-2) were developed and molecularly characterized by the Commonwealth Scientific Industrial Research Organisation (CSIRO). The events contain a construct designed to down regulate two safflower fatty acid biosynthesis genes leading to accumulation of approximately 92% of oleic acid (C18:1) and very low (less than 2%) linoleic acid (C18:2) in the seed, referred to as Super High Oleic acid safflower oil (SHO).

GO Resources Pty Ltd has commercialized SHO in Australia with the premium oil targeted for the industrial lubricant and oleochemical markets. The development and commercialization of Australia's newest GM crop will be presented.

Key words: sustainability, **safflower**, **industrial oil, oleochemicals**