Market Potential for New Safflower Varieties

History and Existing Markets

Safflower has been grown in Australia since the 1950s. Principally these early producers were from Qld, but with new varieties the area spread firstly to northern NSW and then to the southern regions.

Initially the safflower oil was use in the paint and resin industry. Over time markets have expanded and now white safflower seed is sold into the birdseed market, while the oil is used in foods, industrial lubricants, cosmetics, soaps, pharmaceutical products and in biodiesel.

Safflower seed contains approximately 40% oil. There are two types of safflower oil; monounsaturated and polyunsaturated oils. The monounsaturated varieties produce high concentrations of oleic acid. This fatty acid is predominately used as an edible oil. Monounsaturated safflower oil is stable at high temperatures and as such is suitable for frying. The polyunsaturated varieties are high in linoleic acid which is used as salad oils and margarines. Polyunsaturated oils polymerise readily with heat so have limited suitability in cooking. They are utilised in the paint industry; especially in white paints as it does not have the yellow tint found in comparable oils such as linseed oil.

Oil can be extracted in a number of ways; cold pressed, expeller pressed or solvent pressed.

Although safflowers have a good fit in many cropping rotations they are not grown extensively. There are several possible reasons for this, but the primary influence is the volatility of market prices. Price fluctuations in both the oil and bird seed markets are not uncommon.

Agronomics

Safflower can offer some significant benefits to growers in northern NSW and Qld. It is a suitable crop to break cereal disease cycles and can aid in drying soil profiles to depth which can improve soil structure.

Safflower are ideally planted in June and early July. They are best planted into good soil moisture in alkaline to neutral soils. They are a deep rooted species and once established can tolerate dryer conditions. The vigorous tap root system will help to break up hard set soils and dry soil profiles to depth. This can be a significant advantage in managing soil compaction.

Safflower is resistant to both species of root lesion nematode so will not allow numbers to build up. It also provides a break to important diseases such as Crown Rot and Take-all. If good grass weed control is achieved during the safflower rotation significant benefit can be achieved.

Safflower is however susceptible to Phytophthora root rot and Alternaria carthami. Because of this it is best to plant safflower in northern rotation only one year in four.
Exciting Advances from Research

Research being conducted under the GRDC and CSIRO Crop Biofactories Initiative (CBI) is well advanced in the production of renewable crop oils suitable for use as industrial oils. This research has the potential to create new high value markets for safflower oils. The estimated value of the worldwide industrial oils and oleochemical market is $30 billion annually and is expected to expand.

The project has resulted in an engineered safflower which is able to produce oil which is 93% oleic acid, the highest of any commercially available plant-derived oil internationally. This oil has the potential to replace non-renewable petrochemical feedstocks in the production of plastics, paints, lubricants and industrial oils.

Super-high oleic safflower oil (SHOSO) has been 11 years in the making, but has now reached the stage where plants are in field trials and a commercial partner, GO Resources Pty Ltd has been selected.

The SHOSO has been modified using a process known as ‘gene silencing’, where scientists were able to inactivate the genes that encoded two oil-processing enzymes which are active within the safflower seed during seed fill. By inactivating the enzymes scientists have averted the conversion of oleic acid produced in safflower seeds into other less desirable fatty acids.

The team at CSIRO used RNA interface (RNAi) technology developed and patented by the CSIRO. RNAi is the most unobtrusive form of GM technology, but there will still be a need for approval from the Office of the Gene Technology Regulator (OGRT) prior to commercialisation. There is no GM material in the end use oil product, and as the silencing occurs in the seed, the plant is also unaffected by the transgenes.

Safflower was an ideal plant to use in the research as it has limited use for human consumption. It is utilised in industrial oils and paints, and mechanisms already exist to enable efficient segregation of GM seed from mainstream crops.

GO Resources are focussing initially on the biolubricant, biochemical and biomaterial industries, but as the SHOSO is 93% pure, stable and biodegradable there will be many opportunities in a wide range of industrial uses. The commercialisation of the first SHOSO variety is expected in 2018 and will give producers greater diversity of markets for end products. As the world becomes more focused on the use of renewable resources the market potential for plant based oils is expected to grow.

References:

Disclaimer: CFI disclaimer: This publication has been carefully prepared, but it has been written in general terms and should be viewed as broad guidance only. It does not purport to be comprehensive or to render advice. No one should rely on the information contained in this publication without first obtaining professional advice relevant to their own specific situation.