

Second Generation Feedstocks for Biofuels Suitable for Production in North West Victoria



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Skills deficiencies exist in the biodiesel industry in both experience and qualification pathways. Furthermore, the rapid introduction of new technologies also means to a significant extent that we don't know what we don't know. Maintaining an engagement across the sector will require continued interest and exploration by those in industry and education and training sectors including TAFE. The ability to be able to engage in the discussion and nomenclature of innovation is essential to sector knowledge and decision-making. The design of new vocational skills sets, training and industry capabilities will occur most fluidly and comprehensively when knowledge opportunities are actively sought and made available to the wider community.

There is limited technical training opportunity in Australia. An expansion of this industry will highlight the absence of extensive knowledge in biodiesel production; sourcing, selection and grading of suitable feedstocks; product grading and quality assurance mechanisms.

Biodiesel has advantages over other biofuels in that there is no over riding need for new infrastructure or engine design. Any transfer of fuel source to biodiesel is easily accommodated by existing engine technology and design.

Tree crops such as Jatophra may fill some of the feedstock gap that becomes more apparent as the industry expands. The utility of some of these crops in utilising degraded rangelands is attractive though remains largely unexplored in South Eastern Australia.

We do not have a clear understanding of the requirements of second generation feedstocks such as microalgae. Microalgae offers real promise for regional and major cities in Australia to utilise municipal waste, sewerage and agri wastes as CO₂ sources for microalgae lipid production. These processes also offer significant protein, pigment and carbohydrate co-product cost efficiencies. Microalgae, when under reasonable cultivation conditions, may yield up to 27 tonnes oil, 30 tonnes carbohydrate and 40 tonnes of protein per hectare per year.

To address these skills deficiencies comprehensively, the Fellowship program included meetings in Rome, Florence, Verona and culminated at the *Second International Symposium on Energy from Waste and Biomass* in Venice.

Findings arising from this Fellowship will be disseminated through a variety of means over the course of 2009 including presentations to the Mid Murray Agri Business Group, a public presentation at the Mildura Sun Festival, a presentation to the Operations Committee of Sunraysia Institute of TAFE, and provision of the report to stakeholders, supporters and public bodies such as municipal councils. The Fellow maintains his interest and activity in this area and in early 2009 participated in a biofuels tour of Western Victoria with the Department of Primary Industries Victoria, Peter Crisp, Member of Legislative Assembly for Mildura (MLA) and Sunraysia Institute of TAFE staff. Also of significance to knowledge transfer is the Fellow's recently secured appointment as a Director with the Mildura Regional Waste Management Group.

The recommendations in this report are based on research and knowledge obtained, both prior and subsequent to the Fellowship. This knowledge affirms the need to ensure that Victoria engages in technologies such as microalgae to oil technologies. These technologies are suited for exploitation in regional Victorian economies where climate, saline water and

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carbon sources can be sourced. The use of saline ground water, sewerage sludge, olive waste, microalgae carbohydrate and almond waste as sources of CO₂ for fertilizer make rapid growth microalgae possible in open raceway systems in the Mildura, North West Victoria region. In addition, coproduction of lipid (oil), protein, carotene, carbohydrate and polymers are possible in the Mildura, North West Victoria climate.

Within this field of study skill deficiencies exist at all levels. There needs to be a *catalyst facility* (trial farm) where skills can be transferred from academic research to production techniques. Industry collaboration will be necessary as the body of knowledge expands and mainstream/common processes are developed.