

# 2<sup>nd</sup> World Biotechnology Congress

December 04-05, 2017 | Sao Paulo, Brazil

## Reducing petroleum use by developing renewable resources that replace petrochemicals

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The bio-based economy of previous centuries was rapidly displaced with the widespread availability of petroleum and rapid progress in the development of petrochemistry. However, seed oils from some crops are able to provide chemical products that could readily supplant many petroleum-derived products. Biodiesel is an obvious example, and many seed oils are useful in producing fatty acid methyl esters for biodiesel. Yet, certain oilseed crops are especially useful in providing replacements for more complex, higher value products, such as polymers, lubricants and coatings. These crops include but are not limited to linseed, tung, jojoba and castor, with the castor plant perhaps the most broadly useful. The castor oil plant produces a seed containing >50% oil with up to 90% ricinoleic acid, 12-hydroxy oleic acid. The presence of the mid-chain hydroxyl group imparts physical and chemical properties making castor oil uniquely useful as a feedstock for numerous products. However, limited production of castor has allowed petroleum-derived products to displace many castor oil based products from the marketplace, despite better performance characteristics of the castor-based products. A focus on improving castor will ultimately support expanded castor oil production. While castor oil can provide numerous replacements for petrochemicals, there are other oil crops that are perhaps limited in the number of products that they can provide. Nevertheless, these oil crops can have a significant role in reducing the need for petrochemicals, and these crops will also be discussed.

### Biography

Thomas A McKeon has received his PhD in Biochemistry at UC Berkeley with Postdoctoral research in Plant Biochemistry at UC Davis. He is currently a Research Chemist with the US Department of Agriculture, Agricultural Research Service at the Western Regional Research Center in Albany, CA. He has over 100 publications, mostly in plant lipid enzymology and molecular biology. He is an Editor and Chapter Author for the book *Industrial Oil Crops*, published in March 2016 by Elsevier and AOCS Press. He is an Editor for *Biocatalysis and Agricultural Biotechnology* (BAB), a Board Member for American Oil Chemists Society (AOCS) Biotechnology Division and International Society for Biocatalysis and Agricultural Biotechnology (ISBAB). He has organized conferences for ISBAB and for US-Japan Natural Resources (UJNR) Food and Agriculture Panel.

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