


# CSIRO's Tobacco oil project: The Digest's 2015 8-Slide Guide

A game-changing new platform – *in tobacco?*

Controversial by its feedstock role for the cigarette industry, tobacco's been unjustly overlooked. Yet, according to Australia's CSIRO, "tobacco can greatly expand global capacity for renewable oil production." In addition, "Leaf oil composition can be engineered for specific purposes (food, nutritional, industrial FA, fuel)" which "enables intensification of oil production for sustainability."

The Bottom line? "Lowers plant oil feedstock cost, potentially enabling price-competitive biodiesel." Ah. music to our ears. Read on.




**Biomass Oils:**  
Game-changing new  
technology for biofuels  
and bioproducts.

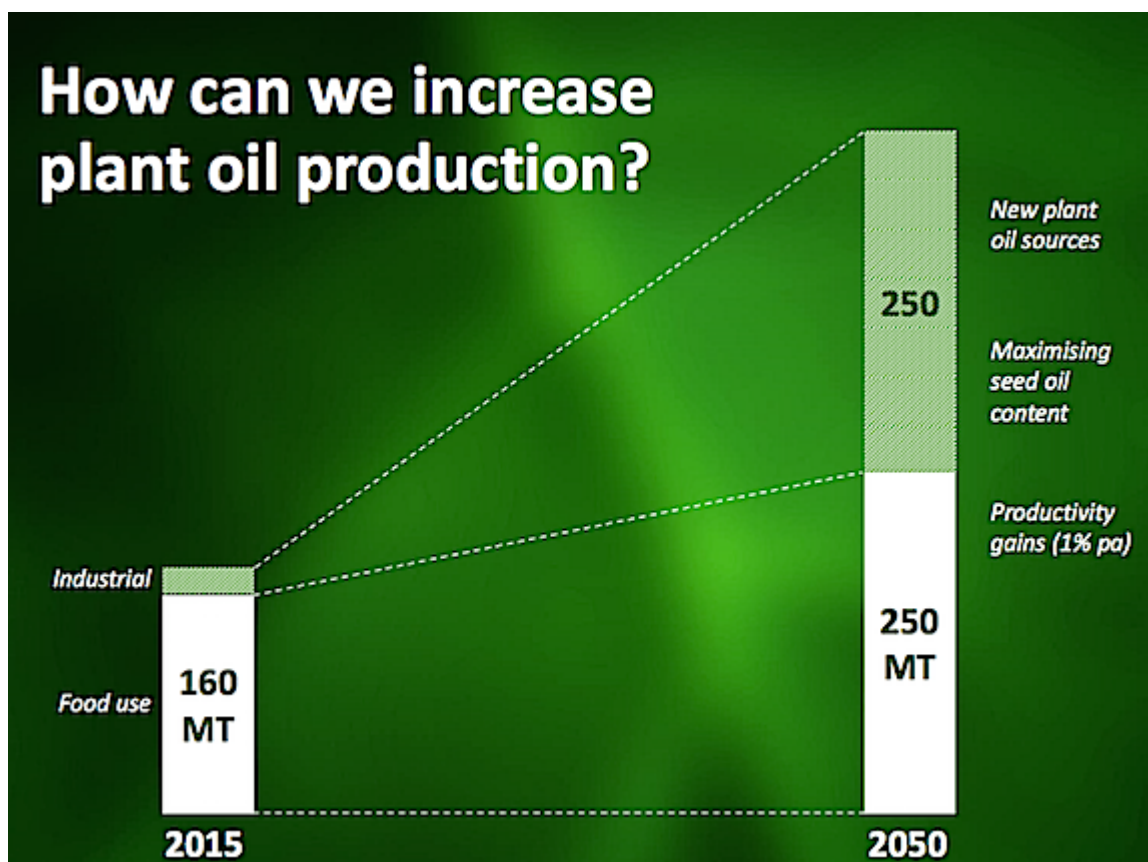
**Allan Green**  
Research Director

CSIRO Bioproducts Program

Thomas Vanhercke  
James Petrie  
Ben Leita  
Surinder Singh



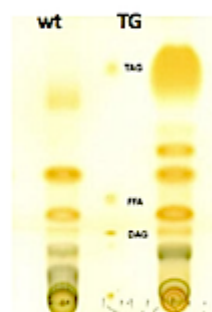
To view the remaining slides, click below on the page links.



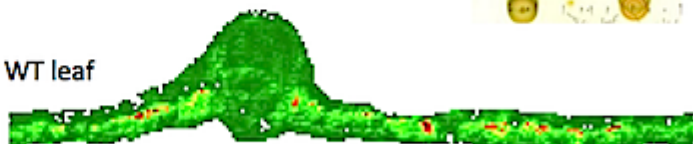
## First tobacco transgenics had 20%+ oil



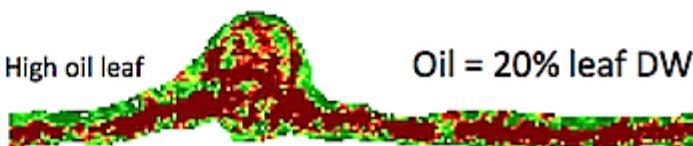
High biomass  
species with stable  
transformation  
system



WT leaf



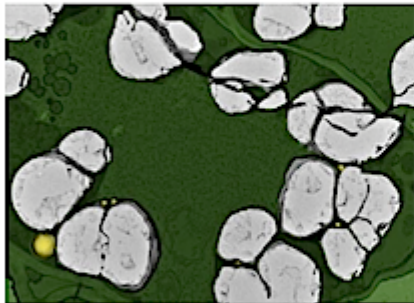
High oil leaf



Oil = 20% leaf DW

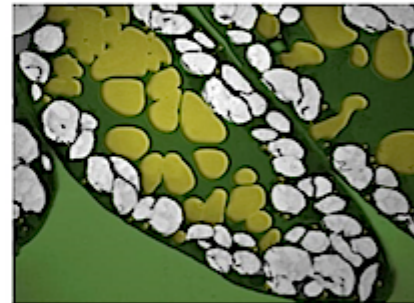
# Leaves with 35% oil content (TAG)

Normal leaf cell



Rich in starch and other polysaccharides  
... but very low in oils  
(TAG < 1%)

CSIRO high-oil leaf



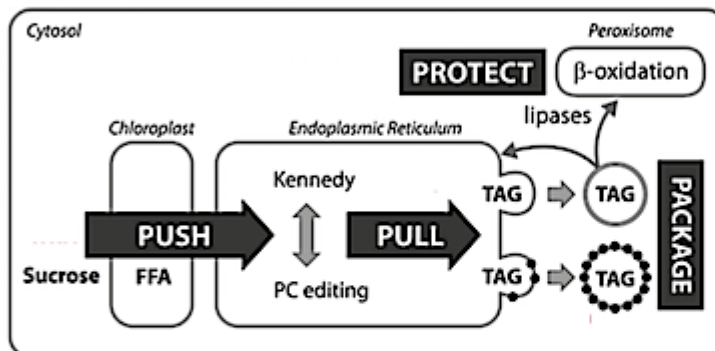
Engineered to accumulate high levels of oil (TAG)  
Equivalent to seed oil levels (35%+ achieved)

**Push**

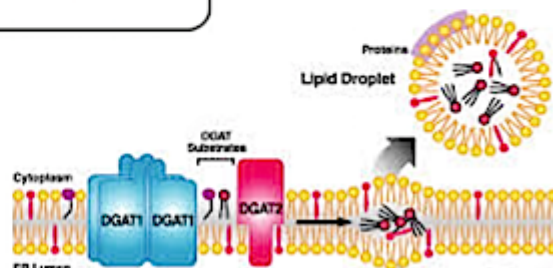
**Pull**

**Protect**

**Package**



Tobacco leaves engineered to upregulate fatty acid synthesis (Push), assemble TAG (Pull), and accumulate TAG by preventing TAG breakdown (Protect & Package).



# Game-changing new platform

- Greatly expands global capacity for renewable oil production, to all plants
- Leaf oil composition can be engineered for specific purposes (food, nutritional, industrial FA, fuel)
- Enables intensification of oil production for sustainability
- Lowers plant oil feedstock cost, potentially enabling price-competitive biodiesel

**1%**  
OIL



Other Lipid	3 %
Protein	4 %
Ash	7 %
Starch	28 %
Fibre (TDF)	29 %
Other CHO	28 %

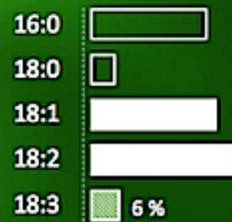
#### Fatty acid (%)



**25%**  
OIL

Other Lipid	2 %
Protein	4 %
Ash	7 %
Starch	24 %
Fibre (TDF)	16 %
Other CHO	22 %

#### Fatty acid (%)



# Tobacco: potential first leaf oil crop



spaced row crop

**10** T/HA

increased plant density

**15** T/HA

high biomass genotype

**20<sup>+</sup>** T/HA

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High biomass tobacco with 35% oil has potential for 6 T/HA oil (= oil palm yield)