

Slides extracted from:
A Case for Malaysia Palm Oil
Renewable Aviation Fuel Integrated with
Phytonutrient Production



ExcelVite

Your Preferred Partner In Palm Nutraceutical Excellence

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Impact to Malaysia

Malaysia produces **20 million mt** of CPO and refined palm oil a year, of which **exceeding 90%** is exported.

Aim: For Malaysia to be a high value product producer;

**Rather than exporting a commodity, Malaysia can aim to be a
Renewable Aviation Fuel & palm-based phytonutrient producer**



ExcelVite Sdn. Bhd.

Brief Background



- High Quality Palm Biodiesel producer in Malaysia
- Patented Process – Single raw material (CPO) - different category of products (**phytonutrients** and **oleochemical/biodiesel**)
- First in the market - commercial source of tocotrienol (super vitamin E)
- The only *PIC/S cGMP-certified tocotrienol producer in the market

* Pharmaceutical Inspection Convention and Pharmaceutical Inspection Co-operation Scheme.



1. Additional Income Streams from Phytonutrients

Most Bio-fuel Companies	ExcelVite's Differentiation
Depend on limited raw materials with uncontrollable prices, and have limited options for final products.	Additional income streams from phytonutrients.
Depend on favourable market prices on raw material and final products, plus subsidies to be profitable.	All other Renewable Aviation Fuels do not have any benefit of phytonutrients. This results in a sustainable business model.



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Palm Oil Is the Richest Natural Source of Mixed-Carotene

- Palm Oil – Richest source of natural carotenes in nature
- Comprising 33% Alpha-Carotene, 62% Beta-Carotene and 5% of other carotenoids (gamma-carotene and lycopene)
- Carotene composition similar to that of carrots

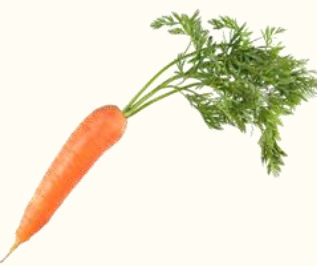


Distribution of Carotenes in Carrot & Red Palm Oil

~33%	α -Carotene	33%
66%	β -Carotene	62%
~1%	Others	~5%



500 – 700 ppm

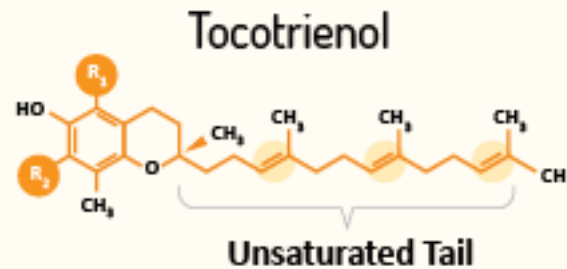


< 100 ppm



Palm Oil Is The Richest Natural Source of Tocotrienols

Despite its existence for over 70 years, few understands what tocotrienol is



- Tocotrienol – alpha-, beta-, gamma-, and delta-tocotrienol – are members of the vitamin E family. A more potent antioxidant = “Super Vitamin E”
- Palm oil is the richest source for all four isoforms of tocotrienol



Tocotrienols

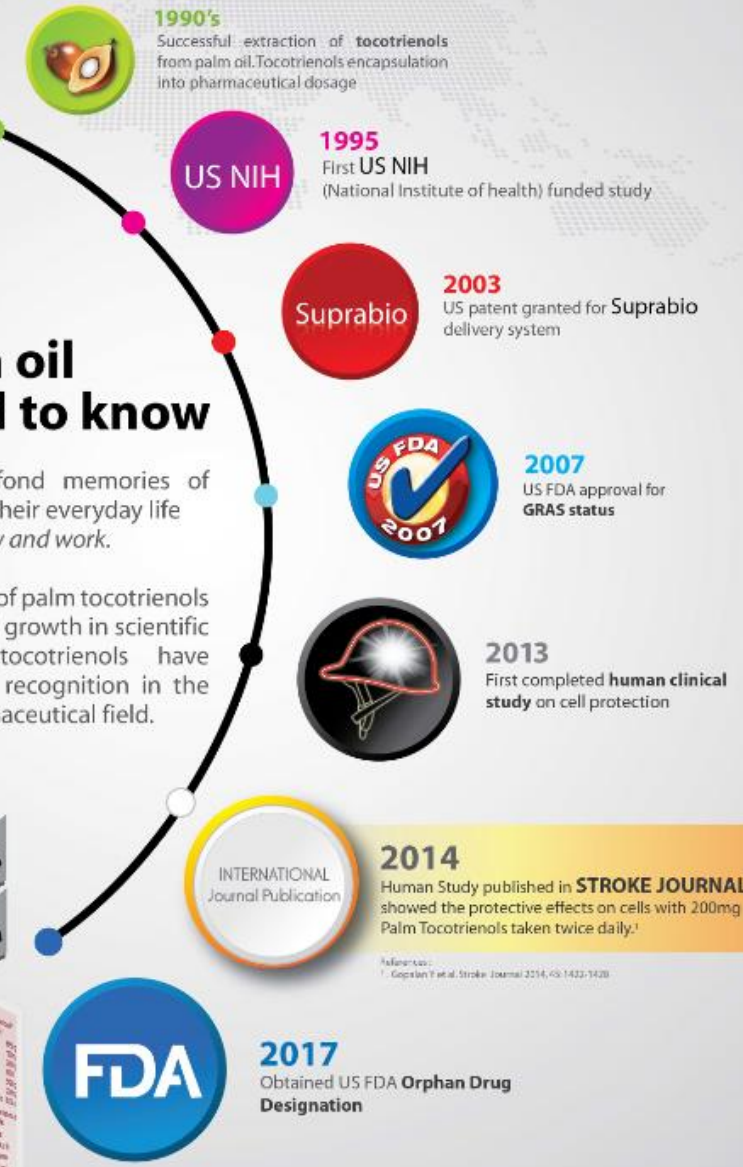
Strong International demand for palm tocotrienols with further growth expected from **clinical trials**



NOT the palm oil you used to know

Malaysians have fond memories of palm oil as part of their everyday life - where you live, play and work.

With the discovery of palm tocotrienols and its exponential growth in scientific research, palm tocotrienols have gained worldwide recognition in the medical and pharmaceutical field.



- Available in 50mg, 100mg and 200mg
- Research dosage of 200mg twice daily
- MAL20025807X

* This is a medicine product advertisement.

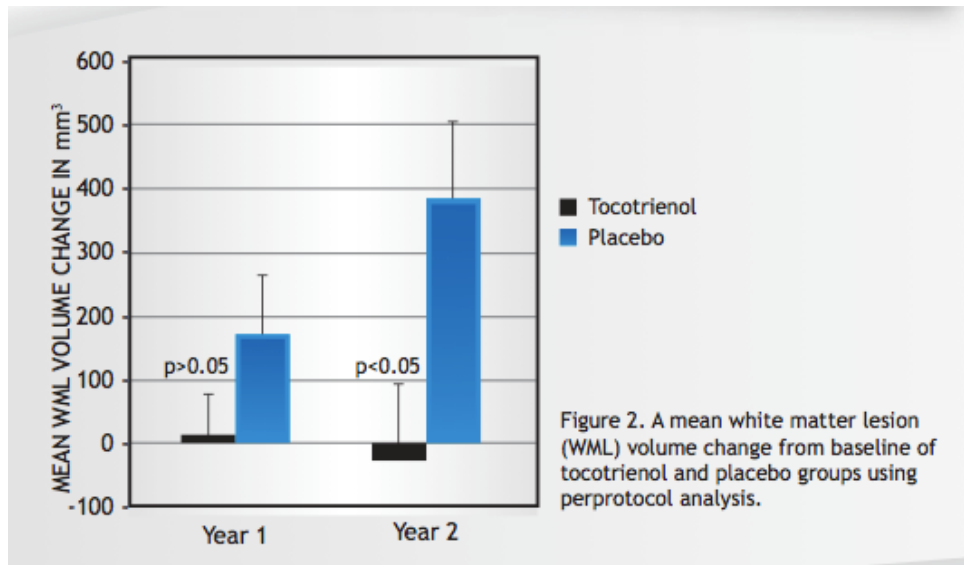
Tocotrienols

Stroke



Clinical Investigation of the Protective Effects of Palm Vitamin E Tocotrienols on Brain White Matter

Yogheswaran G. et al. Stroke, May 2014, DOI: 10.1161/STROKEAHA.113.004449



- Patients given either Tocovid 200mg or placebo twice daily for 2 years
- Brains were measured and recorded using MRI at baseline, year 1 and year 2
- Tocotrienol group had WML volumes that remain unchanged, whereas the placebo group continued to increase over year 1 and 2
- Tocovid stops the progression of WML, hence, it reduces stroke risk compared to placebo
- Importantly, these are completely natural substances and is suitable to be taken for the long term
- **A significant human trial published in renowned, high impact journal *STROKE***
- ***Trials are ongoing to ensure increased uptake of Tocotrienols.***



Phytonutrients



More human and animal studies will be required to drive demand for these phytonutrients.

Tocotrienols: Hovid has a carefully selected pipeline of clinical trials ongoing and some pending funding.

Carotenoids: More studies need to be done in this area, for animal nutrition, and human health and nutrition. Approx half the phytonutrients are carotenoids.

Budget needs to be allocated for these studies.



2. Track Record of delivering a high quality product

Jet fuel has critical applications and implications on people's safety.

ExcelVite has pharmaceutical grade experience.



Failure to deliver a **high standard renewable aviation fuel** can have significant consequences –

- explosions
- human lives taken
- significant financial loss
- damages to our national reputation



MSPO Supply Chain Certification



RSPO Member



Self-Affirmed GRAS



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hovid

Continuous Innovation & Quality

Hovid as ExcelVite's associate company has **Pharmaceutical grade experience** for **30+ years**.

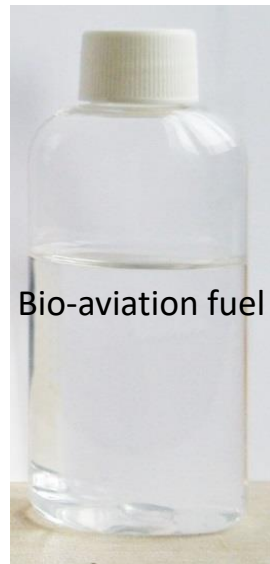
Purity and **quality** of phytonutrient products are also very critical.

Successful Inspections by Health Authorities



3. Collaboration with a leading University

Lab-scale Renewable Aviation Fuel is ready to be further developed.



Lab-scale Renewable Aviation Fuel properties are up to **International Standards** -

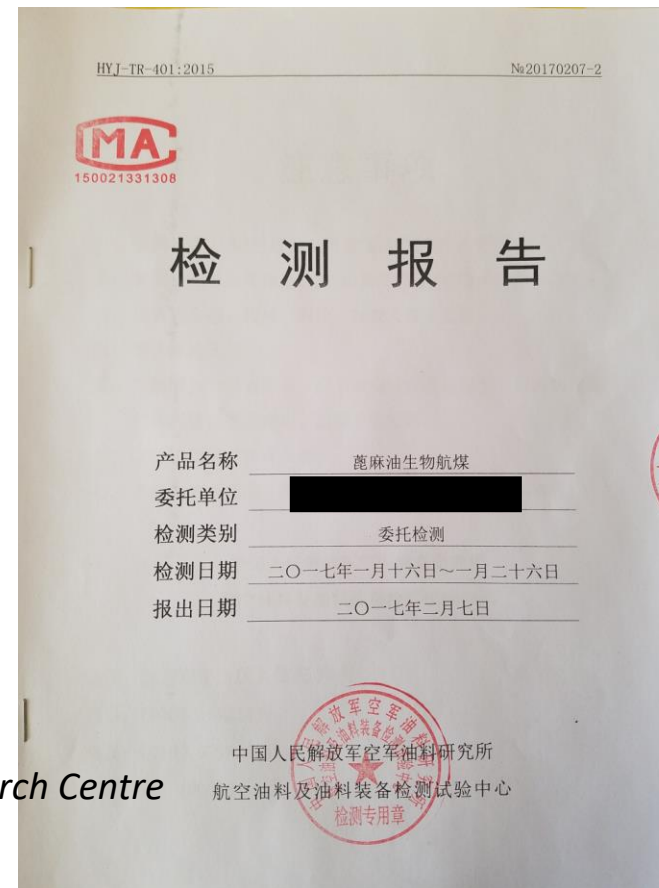
- Fuel Volatility
 - Fluidity
 - Corrosivity
- Flammability
- Thermal stability
- Lubricity analysis



Collaboration with a leading University

Laboratory outputs of Renewable Aviation Fuel (RAF)

Property	Value or range allowed	Lab outputs (20% RAF) from Castor Oil
Density @ 15°C	775.0 – 840.0 kg/m3	782.3 kg.m3
Flash point	min 38°C	42°C
Freezing point	max-47°C	-55.3°C
Smoke point	min 25mm	30
Sulphur content	max 15ppm for renewable fuels	2.9



Certification Report

Commissioned Inspection

Chinese Air Force Research Institute
Aviation Fuel and Oil Material Research Centre



Commercialisation

1. Commence construction of **catalyst** production line in China by our business partner.
2. Commence construction of a **pilot scale Renewable Aviation Fuel facility** in China with our business partner with **ExcelVite** input on **technology** to leverage phytonutrient income.
3. Commence **certification** of plant and Renewable Aviation Fuel.
4. Commence construction of a **commercial scale** plant in Malaysia.



Potential Headwinds

1. Significant **upfront investment** for pilot scale production, certification and investment into plant, machinery and equipment.
 - A. Long lead time before first revenue.
2. Concurrent **R&D into Tocotrienols & Carotenes** to ensure increased uptake of these products when production is ready.
3. Acceptance of Renewable Aviation Fuel from **Airlines**.
4. **Government Mandate & Support** in Renewable Aviation Fuel.

