



# Palm Bioactives for Kidney Health

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# Disclosure

- Research grants – Govt of Malaysia (Ministry of Higher Education; Malaysian Palm Oil Board)
- National Kidney Foundation (Malaysia)
- No other actual or potential conflict of interest in relation to this presentation.

# Learning Outcomes

At the end of this sharing session, the participant should be able to:

- Describe various type of bioactive compounds of oil palm
- Discuss metabolic changes and nutritional issues of chronic kidney diseases
- Elaborate current evidence of tocotrienols on chronic kidney diseases

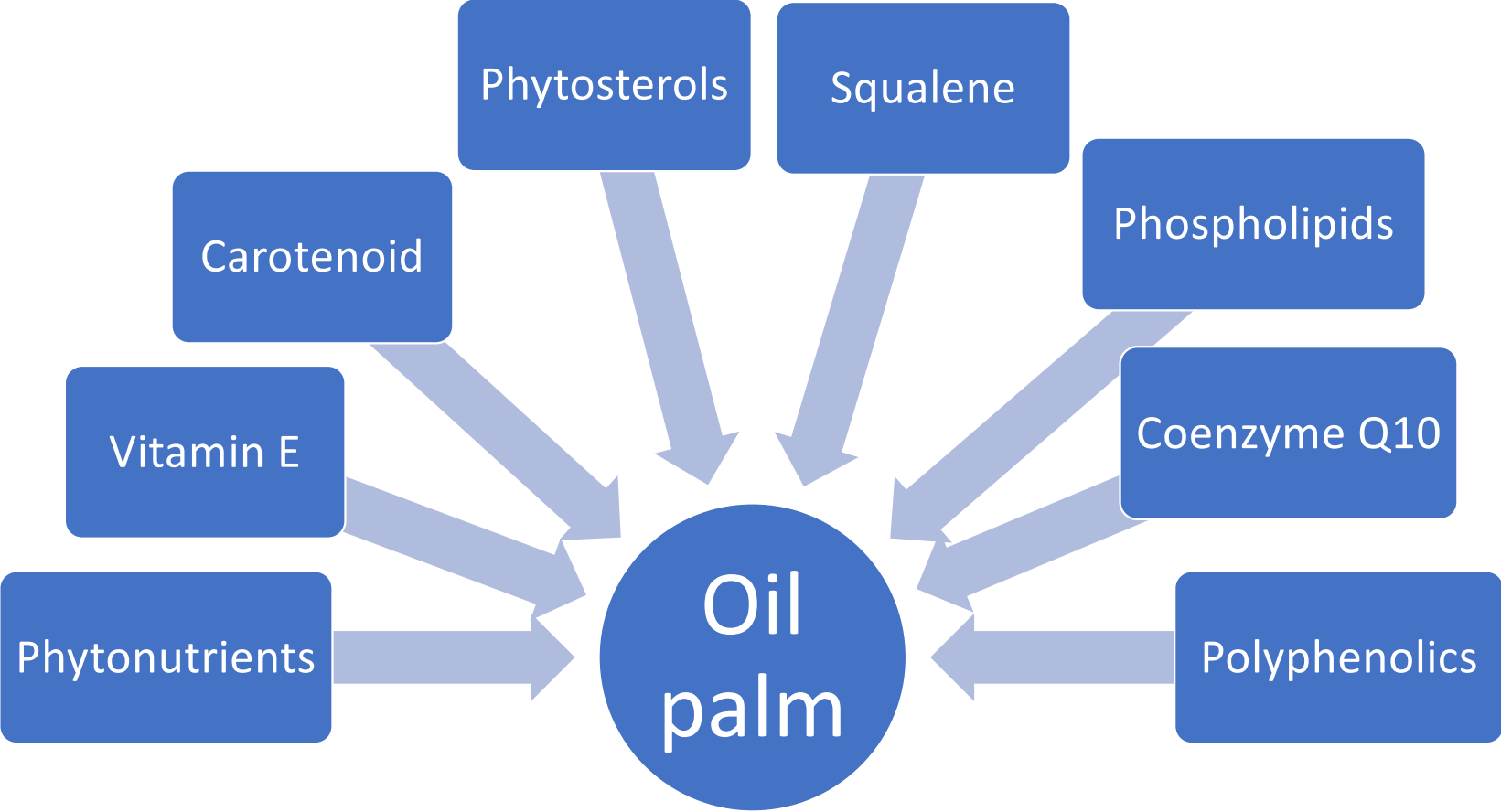


# What is palm bioactive compound?

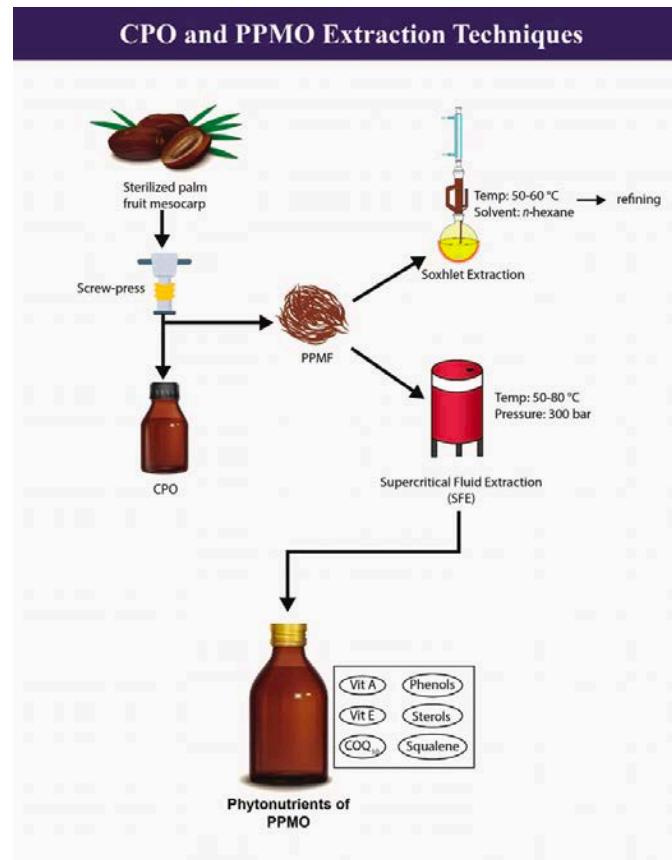
- A type of chemical found in small amounts in oil palm plants
- May promote or have beneficial effect on health.
- Play wide range of functions including antioxidant, anti-inflammatory, anti-cancer and anti-microbial properties.
- Examples of bioactive compounds:
  - Carotenoids –  $\beta$ -Carotene; lycopene
  - Phenolic acids – Gallic, Ferulic acid
  - Tocotrienols
  - Sterols - phytosterols



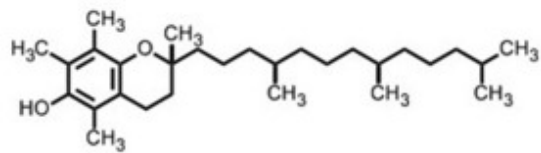
# Oil palm minor compounds



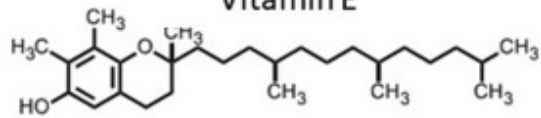
# How do we extract oil palm bioactive compound?



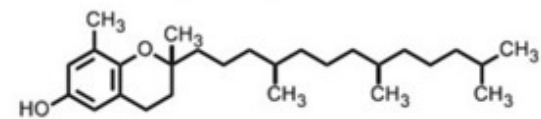
# Vitamin E - Tocopherols vs Tocotrienols



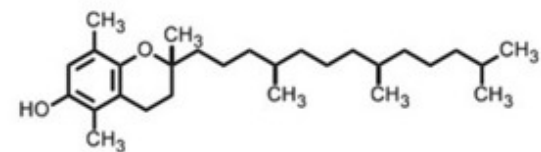
$\alpha$ -Tocopherol  
Vitamin E



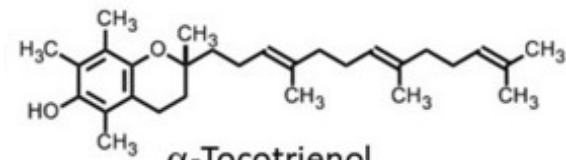
$\gamma$ -Tocopherol



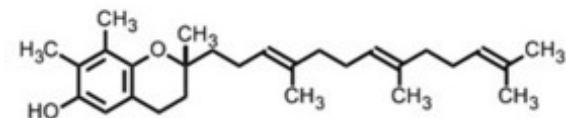
$\delta$ -Tocopherol



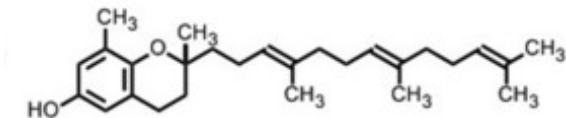
$\beta$ -Tocopherol



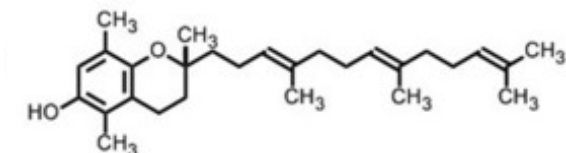
$\alpha$ -Tocotrienol



$\gamma$ -Tocotrienol



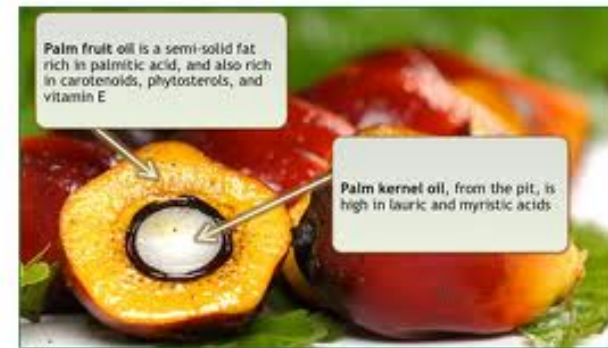
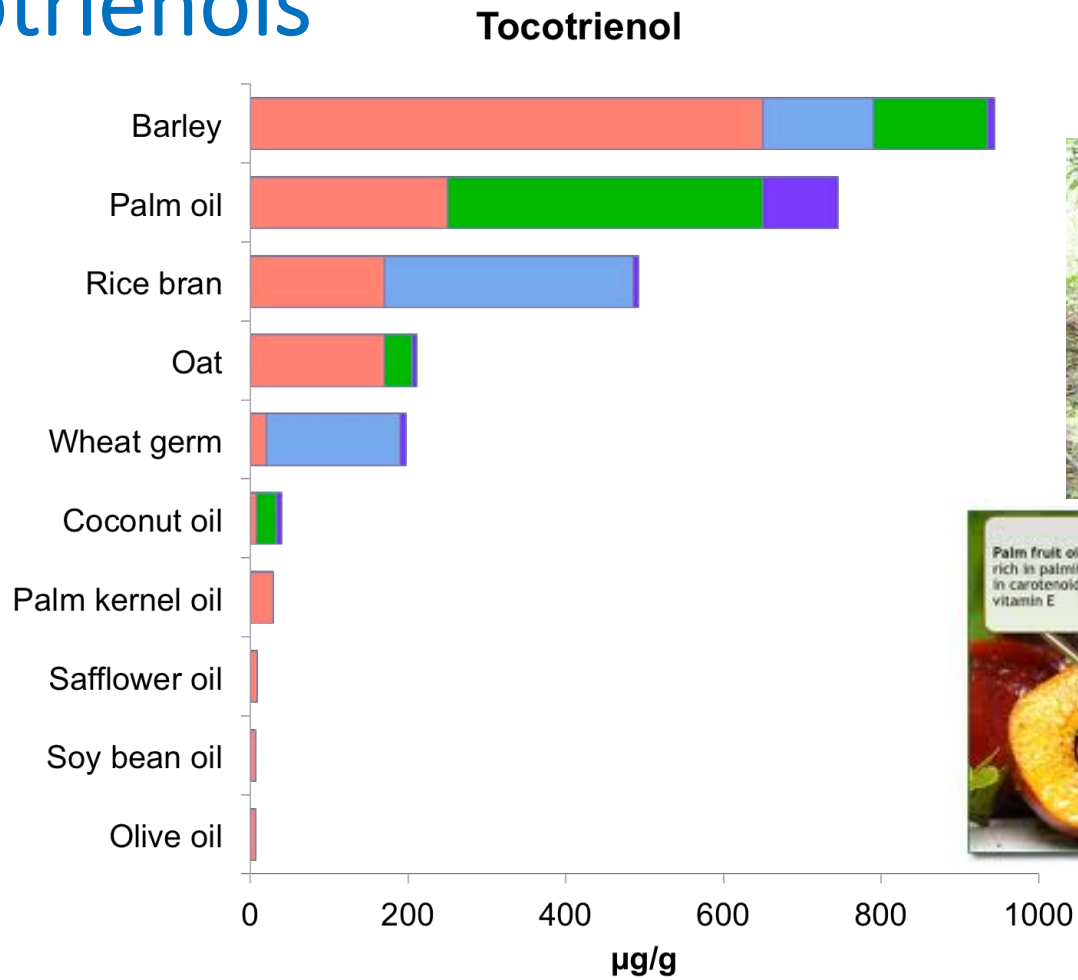
$\delta$ -Tocotrienol



$\beta$ -Tocotrienol



# Tocotrienols

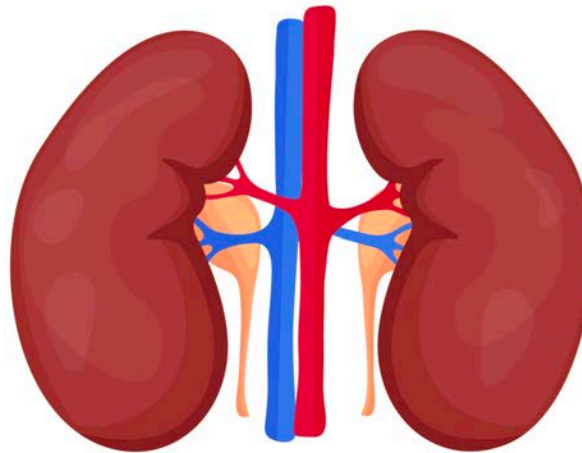




# Scope of renal disease covered

## ACUTE

- Develops w/in hrs or days
- Causes:
  - Traumatic
  - Acute intoxicants
  - Multiorgan failure
  - Other diseases



## CHRONIC

- Develops over years/irreversible
- Causes:
  - 2o to high BP, DM
  - Chronic bacterial inflammation
  - Cystic kidneys
  - Autoimmune diseases

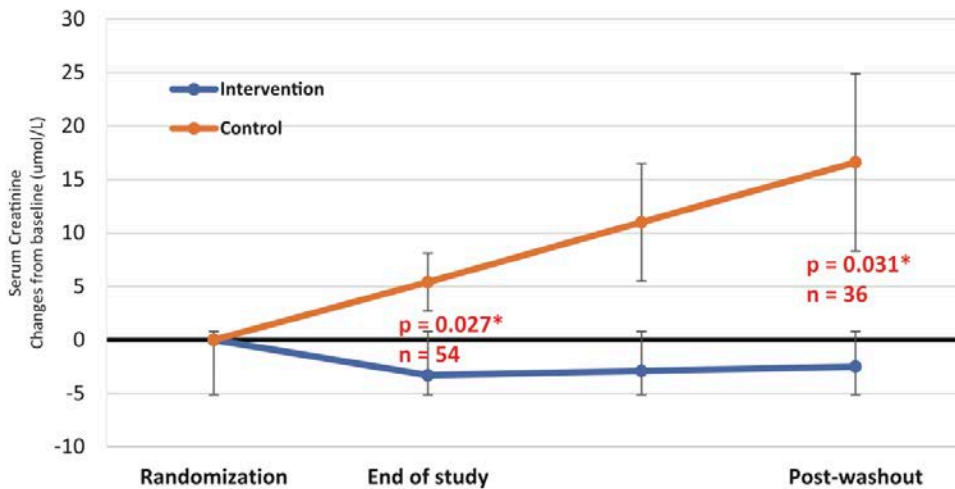
# Tocotrienols & Diabetic Kidney Diseases

## Tocotrienol-rich vitamin E improves diabetic nephropathy and persists 6–9 months after washout: a phase IIa randomized controlled trial

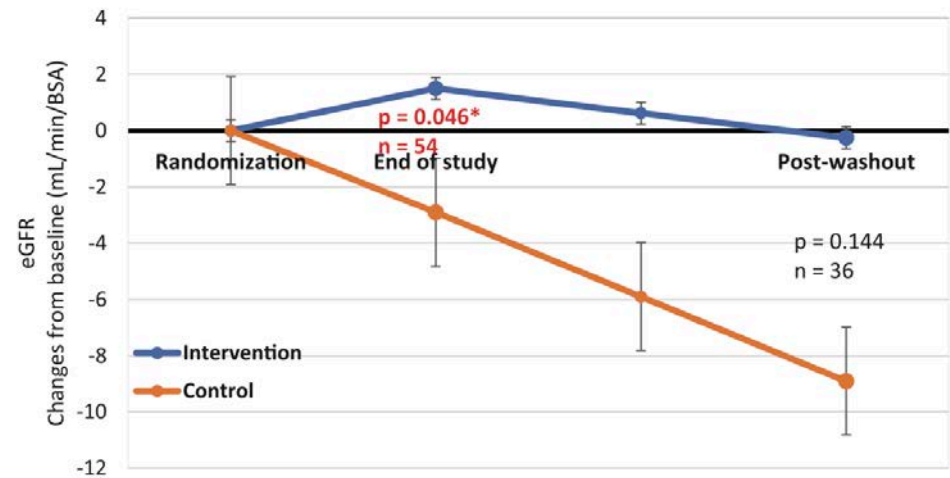
Gerald Chen Jie Tan , Suzanne May Quinn Tan, Sonia Chew Wen Phang, Yeek Tat Ng, En Yng Ng, Badariah Ahmad, Uma Devi M. Palamisamy and Khalid Abdul Kadir

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Overall Change in Serum Creatinine



Overall Change in eGFR



# Tocotrienols & Dyslipidemia in CKD

Vascular Health and Risk Management

Dovepress

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 Open Access Full Text Article

ORIGINAL RESEARCH

## Vitamin E tocotrienol supplementation improves lipid profiles in chronic hemodialysis patients

This article was published in the following Dove Press journal:  
Vascular Health and Risk Management  
27 November 2013  
[Number of times this article has been viewed](#)

Zulfitri A Mat Daud<sup>1</sup>  
Boniface Tubie<sup>2</sup>  
Marina Sheyman<sup>2</sup>  
Robert Osia<sup>2</sup>  
Judy Adams<sup>2</sup>  
Sharon Tubie<sup>2</sup>  
Pramod Khosla<sup>1</sup>

<sup>1</sup>Department of Nutrition and Food Science, Wayne State University, Detroit, MI, USA; <sup>2</sup>Great Lake Dialysis Clinic, LLC, Detroit, MI, USA

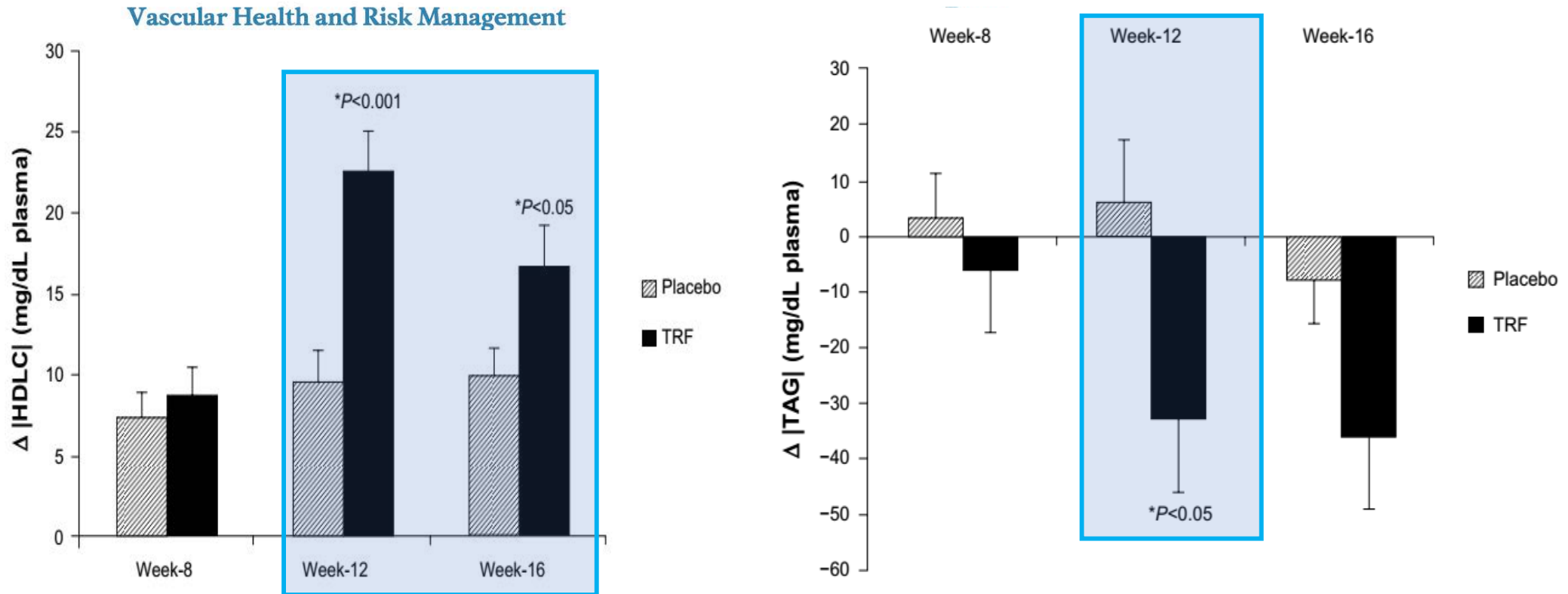
**Purpose:** Chronic hemodialysis patients experience accelerated atherosclerosis contributed to by dyslipidemia, inflammation, and an impaired antioxidant system. Vitamin E tocotrienols possess anti-inflammatory and antioxidant properties. However, the impact of dietary intervention with Vitamin E tocotrienols is unknown in this population.

**Patients and methods:** A randomized, double-blind, placebo-controlled, parallel trial was conducted in 81 patients undergoing chronic hemodialysis. Subjects were provided daily with capsules containing either vitamin E tocotrienol-rich fraction (TRF) (180 mg tocotrienols, 40 mg tocopherols) or placebo (0.48 mg tocotrienols, 0.88 mg tocopherols). Endpoints included measurements of inflammatory markers (C-reactive protein and interleukin 6), oxidative status (total antioxidant power and malondialdehyde), lipid profiles (plasma total cholesterol, triacylglycerols, and high-density lipoprotein cholesterol), as well as cholesteryl-ester transfer

Daud et al 2012

# Tocotrienols & Dyslipidemia in CKD

## Vascular Health and Risk Management

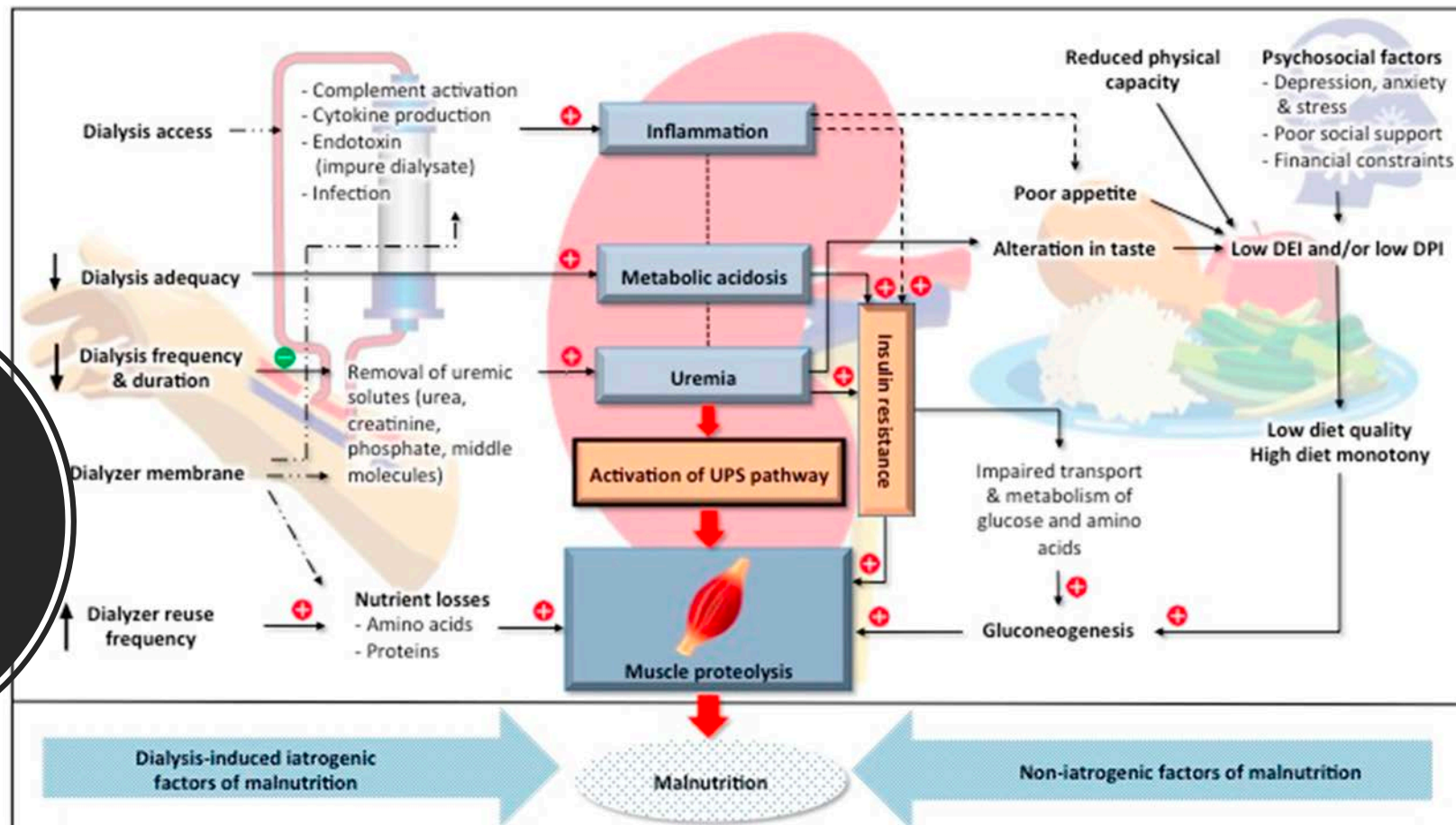


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<sup>1</sup>Department of Nutrition and Food Science, Wayne State University, Detroit, MI, USA; <sup>2</sup>Great Lake Dialysis Clinic, LLC, Detroit, MI, USA

measurements of inflammatory markers (C-reactive protein and interleukin 6), oxidative status (total antioxidant power and malondialdehyde), lipid profiles (plasma total cholesterol, triacylglycerols, and high-density lipoprotein cholesterol), as well as cholesteryl-ester transfer

# Nutritional and metabolic impact of CKD



Abbreviations: DEI, dietary energy intake; DPI, dietary protein intake; UPS, ubiquitin-proteasome system

Notes:

--> Association, causal-effect relationship yet to be established

-> Influences

+ Exacerbates

- Treatment insufficiency



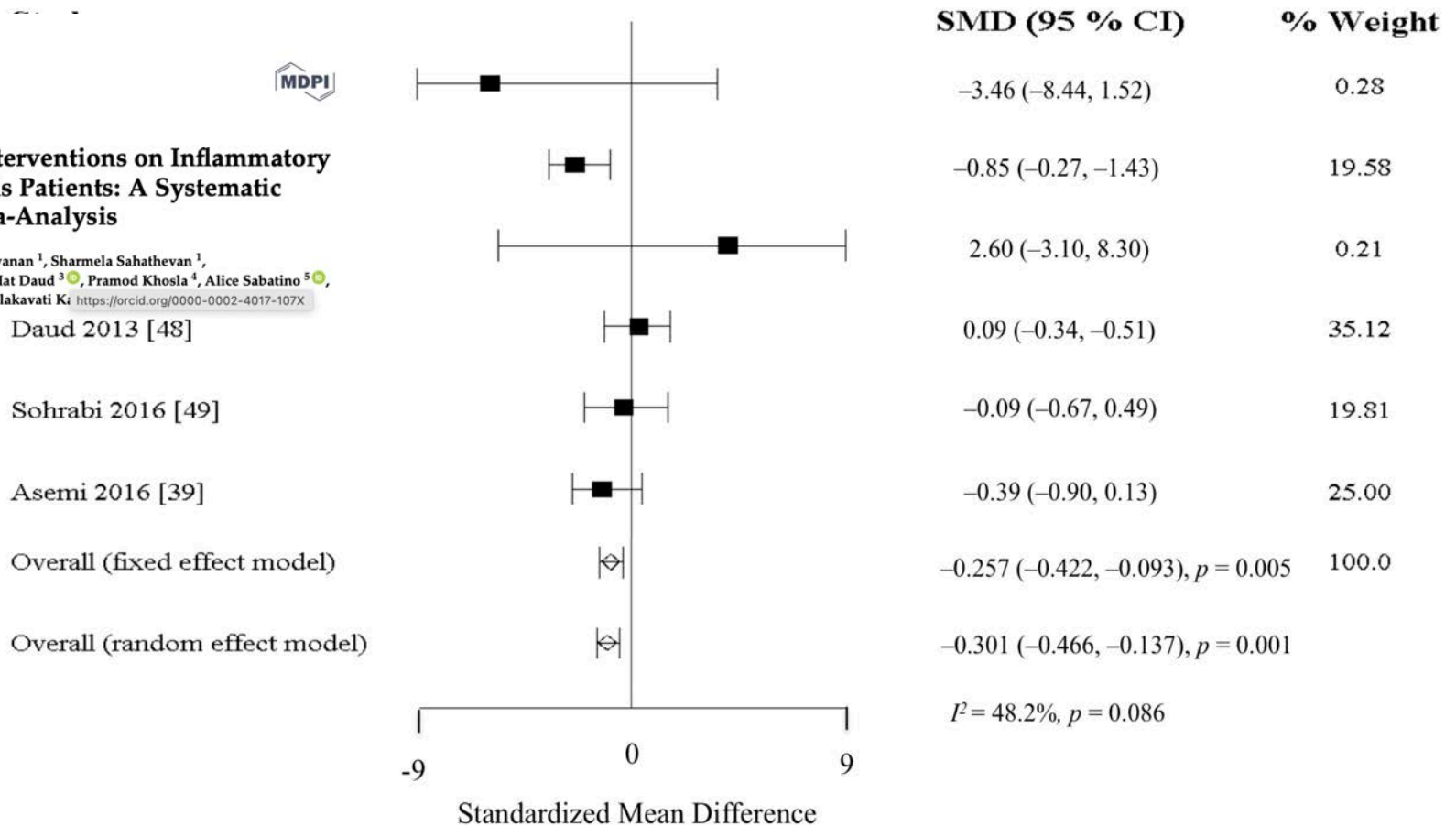
# Change in inflammatory markers following vitamin E supplementation in HD patients



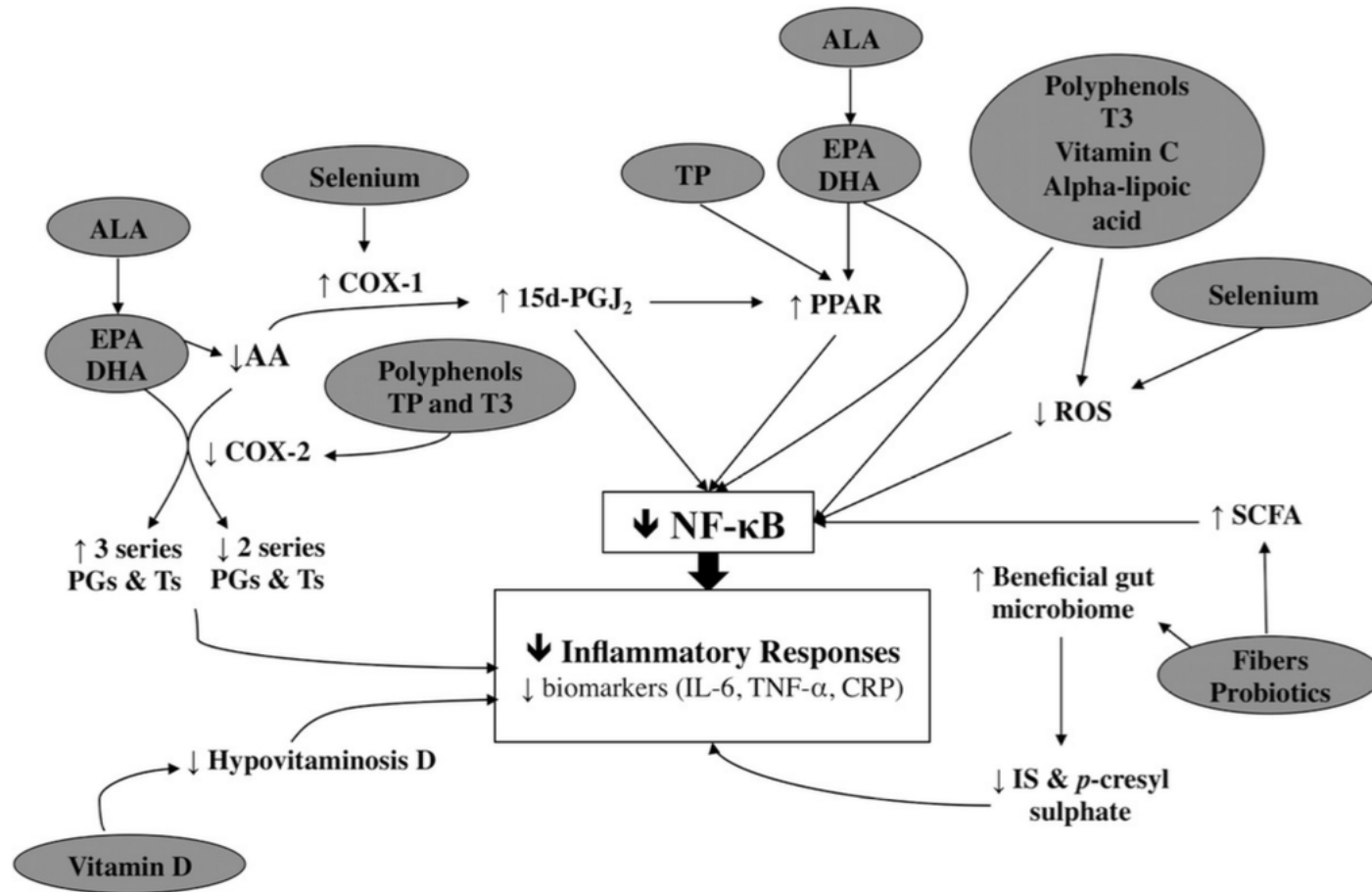
Review

## Efficacy of Nutritional Interventions on Inflammatory Markers in Haemodialysis Patients: A Systematic Review and Limited Meta-Analysis

Ban-Hock Khor<sup>1</sup>, Sreelakshmi Sankara Narayanan<sup>1</sup>, Sharmela Sahathevan<sup>1</sup>, Abdul Halim Abdul Gafor<sup>2</sup>, Zulfitri Azuan Mat Daud<sup>3</sup>, Pramod Khosla<sup>4</sup>, Alice Sabatino<sup>5</sup>, Enrico Fiaccadori<sup>5</sup>, Karuthan Chinna<sup>6</sup> and Tilakavati Ki <https://orcid.org/0000-0002-4017-107X>



# Tocotrienols & Inflammation in CKD



The background is a light green gradient. On the left, there are several 3D cubes of varying sizes and orientations, some appearing to float or be connected by thin white lines. On the right, there is a network diagram consisting of white dots connected by thin white lines, forming a complex web of connections. The overall aesthetic is clean, modern, and scientific.

# Preliminary data from Palm Tocotrienols in Chronic Hemodialysis (PATCH-Malaysia) study

# Research Objectives

## **Primary Objective:**

To document the extent to which supplementation with 300mg/day with a tocotrienol-rich-fraction from palm oil (TRF) improves dyslipidemia (TAG, TC, HDL-C, TC/HDL-C ratio, LDL-C) and inflammation (hsCRP) in patients with end stage renal disease (ESRD) who are on hemodialysis (HD).

## **Secondary Objectives:**

1. To document the effects of TRF supplementation on nutritional (serum albumin, MIS, multiple 24hr recall) in ESRD patients on HD.
2. To document the extent to which TRF supplementation decrease the severity of the symptoms associated with restless leg syndrome (RLS) in ESRD patients on HD.

# Acknowledgement



## **The Nephrology Community of Malaysia**

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Abdul Halim Abd Gafor, Soo Kun Lim, Sunita Bhavanandan,  
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## **National Kidney Foundation of Malaysia**

## **National Renal Registry**

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Universiti Kebangsaan Malaysia**



thank YOU  
ধন্যবাদ

