Journal of Oil Palm, Environment & Health

Abstracts

PALM INTERNATIONAL NUTRA-COSMECEUTICAL CONFERENCE (PINC) 2021

**SUSTAINING HEALTHY LIFESTYLES FROM FATS
AND BIOACTIVES**

Journal of Oil Palm, Environment and Health (JOPEH) is an Open Access online forum to share knowledge that focuses on oil palm cultivation, palm oil production and applications. This will include the impacts resulting from such activities, particularly those related to the environment. JOPEH will also feature articles related to issues and policies that affect any of the above palm oil industry activities. JOPEH is targeted to reach a wide spectrum of readers. The contents of the Journal will be in the form of original research papers, short communications, editorials, viewpoints and comments. Due to its wide array of topics, JOPEH will be useful to researchers, academicians, policy makers, practitioners and the general public who are associated with or have an interest in palm oil and the global oils and fats industry.

SUSTAINING HEALTHY LIFESTYLES FROM FATS AND BIOACTIVES (6 – 8 January 2021)

After more than three decades of concerted research, aimed at better understanding of palm oil and its components for their effects on human health, there is still significant misinformation about palm oil. Misinformation has often resulted in mistrust and confusion despite a battery of credible scientific evidence that systematically exposes positive outcomes from these research projects conducted at some of the most renowned biomedical centres around the world. PINC 2021 is therefore a key scientific platform aimed at deliberating these issues and providing the most updated and correct science-based nutritional outputs. This event hosted some of the best expertise in palm oil and health. The voices of these experts should go a long way to resolve many issues about dietary fats, palm oil and healthy lifestyle management. PINC 2021 aspires to highlight the positive roles of palm oil and its known bioactives including tocotrienols, carotenoids and phenolics on human health and nutrition.

The complete set of PINC 2021's presentations and videos can be accessed at the website, www.mpoc.org.my

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1. Palm Tocotrienols in Health and Wellness

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Abstract

Twenty years ago, our work recognized the multifold advantage, on a concentration basis, of α -tocotrienol over α -tocopherol in neuroprotection. This is of high significance considering our report that supplementation with excessive levels of α -tocopherol can exacerbate stroke-induced brain injury. Follow up studies aimed at deciphering the molecular basis of such extraordinary property of tocotrienol (TCT) led to the discovery of novel molecular underpinnings of neurodegeneration. Two decades later many of those key findings have been reproduced by several independent laboratories. Human studies showed that tocotrienols, taken orally, are efficiently delivered to human tissues. Cellular studies translated into neuroprotection in vivo in rodent stroke studies. These works paved the way to pre-clinical studies on canine stroke unveiling yet another novel facet of tocotrienol action. In canines, tocotrienol-enriched (TE) supplementation significantly attenuated ischemic stroke-induced lesion volume. Furthermore, TE prevented loss of white matter fiber tract connectivity after stroke as evident by probabilistic tractography. Post hoc analysis of cerebral angiograms during MCA occlusion revealed that TE-supplemented canines had improved cerebrovascular collateral circulation to the ischemic MCA territory. This observation has led to a new project, currently active, funded by the National Institutes of Health investigating how pial collaterals in the stroke-affected brain are responsive to dietary tocotrienol. Recently we reported a double-blind, randomized, single-center phase II clinical trial comparing placebo (PBO) and 400 and 800 mg TCT daily for a year in 150 patients with a sentinel ischemic stroke or mini-stroke (transient ischemic attack, TIA) event in the prior 6 months. Platelet function was measured at baseline and then, at 3-month intervals for a year. Results showed that in patients taking aspirin and clopidogrel, the incidence of aspirin resistance was significantly decreased from 40% in PBO-treated patients to 9% in the 400 mg TCT group and 25% in the TCT 800 mg group ($P = 0.03$). Patients on aspirin and clopidogrel had a higher incidence of aspirin resistance than all patients treated with aspirin alone and TCT decreased the frequency of aspirin resistance in this group. Aspirin resistance is known to be associated with higher cardiovascular events and therefore these findings are of extraordinary significance in healthcare. Tocotrienol research findings of our laboratory, stroke-related and others, will be discussed.

Dr. Chandan K. Sen is a J. Stanley Battersby Chair and Professor of Surgery, Distinguished Professor and Director of the Indiana Center for Regenerative Medicine and Engineering (ICRME). At IU, he serves as Associate Vice President of Research. At the IU School of Medicine, he serves as Associate Dean of Research. At Indiana University Health, Dr. Sen is the Executive Director of the Comprehensive Wound Center. Dr. Sen is recognized as a Lilly INCITE scholar. Dr. Sen is the Indiana PI for the six center NIH sponsored Diabetic Foot Consortium. After completing his Masters of Science in Human Physiology from the University of Calcutta, Dr. Sen received his PhD in Physiology from the University of Eastern Finland. Dr. Sen trained as a postdoctoral fellow at the University of California at Berkeley's Molecular and Cell Biology department. His first faculty appointment was in the Lawrence Berkeley National Laboratory. In 2000, Dr. Sen was tenured John H & Mildred C Lumley Professor of Surgery, Executive Director of The Ohio State University Comprehensive Wound Center and Director of the Ohio State University's Center for Regenerative Medicine & Cell Based Therapies. Dr. Sen's primary areas of research interest include tissue injury, repair, regeneration and infection. His group has pioneered the Tissue Nanotransfection (TNT) technology in regenerative medicine. TNT received the 2018 Edison Awards for Innovation. Dr. Sen's work has also led to electroceutical management of tissue infection. In 2016, this technology received the Frost & Sullivan award for new product innovation. Dr. Sen has published over 325 peer reviewed publications and a dozen books which are currently cited over 35000 times in the literature. He has a current H-index of 98.

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2. Skin Protective Effects of Tocotrienol-Rich Fraction Against Urban Air Pollutant

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Abstract

In the present study, we evaluated the protective effects of a tocotrienol-rich fraction (TRF) on PM2.5-induced skin cell damages *in vitro*. Consumer trends are moving towards taking functional food and beverages over supplements to support wellness. To ensure that TRF could be successfully incorporated into functional food and beverages, we assessed if the use of a water-dispersible powder TRF (DVP 30-WD) in different consumer products led to perceived sensorial differences. Human epidermal keratinocytes (HEKs) cells were treated with PM2.5 in the presence or absence of TRF. Oxidative stress level, inflammation status and skin barrier function were assessed after the treatments. A Triangle Taste Test was carried out in accordance with the ASTM Standard Test Method for Sensory Analysis—Triangle Test (ASTM E1885).

TRF inhibited PM2.5-induced reactive oxygen species (ROS) generation in HEKs. In addition, TRF had a significant anti-inflammatory effect, as evidenced by the significant attenuation of PM2.5-induced up-regulation of cyclooxygenase-2 (COX-2). TRF showed to restore the skin barrier function after the exposure of PM2.5, according to the increased level of filaggrin protein expression. In the Triangle taste test, a total of 10 panellists participated in the study. Samples (milk, yogurt, orange juice, carbonated soda and cultured milk drink) using a water-dispersible powder format of TRF (DVP 30-WD) were indistinguishable in terms of taste from the original drinks, indicating that DVP 30-WD is organoleptically acceptable. TRF may potentially be used as an active ingredient in functional food and beverages against pollutant-induced skin damages.

Dr. Yap Wei Ney is now Section Head of KLK-Oleo Biological at Davos Life Science Pte Ltd. She holds a PhD in Pharmacology from National University of Singapore. She has more than 10 years' research experience in tocotrienols (a palm oil derived natural vitamin E), specifically the benefits and mechanism of action of this active ingredient in human health and nutrition. She is currently leading a team to generate the scientific evidences span across preclinical studies including establishment of cell line and animal models for proof of concept studies; as well as clinical trials for efficacy investigation. Her research work has received educational fellowship award from the European Academy of Dermatology Venereology (EADV) in 2014. Moreover, the company she is working now has previously received the 2017 finalist for the Nutraingredient Award for the Heart Health Category at VitaFood Europe, Geneva.

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3. Role of Tocotrienols in the Management of Cancer: Application of Nanotechnology

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Abstract

The worldwide cancer burden is projected to increase by 2-fold over the next 20 years. Nutrition and lifestyle, and their influences on obesity, are known as important risk factors for various malignancies. Long term exposure to oxidative stress leads to chronic inflammation, underlining the trigger factor for chronic diseases. Tocotrienols are fat-soluble antioxidants with potent anti-inflammatory properties. Being part of the vitamin E family, they can be sourced from vegetable oils, most abundantly in palm oil. More than 2 decades of studies focused on the anti-tumour effect of palm-tocotrienols, supported by fundamental mechanistic elucidation. In the hallmarks of cancer, palm-tocotrienols acted on 3 different mechanisms, i.e. tumour suppressors, immune modulation and inflammation. Here, we summarize the recent advancement of tocotrienol research in these areas. Nanotechnology has revolutionized the delivery method of nutrients to target sites due to their small size and the possibility to engineer their properties. In studies using tumour-targeted nanoparticles, tocotrienols induced significant tumour suppression in several tumour models including triple-negative breast cancer, epithelial cancer and melanoma. Further study on the proof of hypothesis showed enhanced absorption of tocotrienols by 8-fold when delivered via nanocarriers. It was postulated that between a third and a half of cancers are preventable based on present knowledge in risk factors. This review summarizes the opportunities and barriers of growth of tocotrienols in cancer management, as well as the application of nanotechnology.

Dr. Fu Ju-Yen graduated as a pharmacist from the University of Strathclyde, UK and pursued a PhD in pharmaceutical sciences under a scholarship from the Malaysian Palm Oil Board. She has been serving MPOB as a research officer in the Nutrition Unit, addressing industrial and research needs for palm-based downstream products, specifically in the food and nutraceutical area. Her experience in formulation science and nanotechnology facilitates value addition to palm-phytonutrients (tocotrienols, carotenes, etc) and natural bioactives. Her work encompasses a wholesome research program for palm-tocotrienols from product development to clinical trials and regulatory affairs. She is the Vice President for Controlled Release Society Malaysia Chapter and a committee member in the Malaysian Technical Committee on Nanotechnologies.

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4. Role of Carotenoid Supplementation for the Prevention of Cardiometabolic Risk and Visceral Obesity in Children

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Abstract

Dysmetabolic obesity during childhood and adolescence currently represents one of the greatest therapeutic challenges for healthcare systems worldwide. The global rates of obesity have more than doubled in the last 30 years. A recent meta-analysis from national surveys and food composition studies suggests an inverse association between lower carotenoid levels and exposure and the prevalence of Metabolic Syndrome in the general population, independent of serum retinol (vitamin A) levels. In children, two double-blind randomized placebo-controlled studies describing the effects of mixed carotenoid supplementation on insulin resistance, adipokines and the rate of accrual of subcutaneous abdominal fat, implicate these compounds in the management of obesity, diabetes and cardiovascular disease. We will discuss the role of carotenoids and their conversion products (retinoids) in adipogenesis, lipolysis, insulin resistance and the pathophysiology of metabolic syndrome and review the animal studies, which may help support these findings.

Jose Atilio Canas earned his medical degree from Universidad Nacional Pedro Henriquez Urena in the Dominican Republic. He completed his pediatrics residency and served as Chief Resident at Nassau County Medical Center. There he also completed a clinical and research fellowship in pediatric endocrinology and metabolism. He is currently an Attending Physician in the Division of Endocrinology and Diabetes at Johns Hopkins All Children's Hospital in St Petersburg, Florida, United States. His interests include the prevention and treatment of Metabolic Obesity and Cardiovascular Risk Factors in children. His research focuses on the effects of mixed carotenoid supplementation on abdominal fat accrual and insulin resistance. He has successfully completed two placebo-controlled clinical trials on the subject which have produced several publications. His contributions include 47 peer reviewed articles published in national and international journals such as The Journal of Pediatrics and The Journal of Nutrition.

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5. Palm Fruit Bioactives Complex (PFBC) Activates the Heart-Brain-Axis

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Abstract

Palm Fruit Bioactive complex (PFBC) has demonstrated antioxidant and anti-inflammatory properties that may have cardiovascular and neurologic health benefits. Therefore, we have undertaken a variety of human supplementation trials to elucidate the role of PFBC on the emerging “Heart-Brain-Axis” whereby these organs communicate with and enhance one another’s function. Dynamic changes in heart rate variability (HRV) are considered as markers for autonomic nervous system (ANS) balance and HRV is reduced in both depression and heart disease, suggesting common physiological mechanisms.

Our studies investigated different doses of PFBC, ranging from 125mg-1,000mg/day, on measures of inflammation/oxidation (IL-6, IL-1B, MCP-1, ORPc, BDNF), heart rate variability (emWave), and psychological mood state (POMS). These measures enable a holistic view of “Heart-Brain-Axis” dynamics whereby nutrition may impact physical (heart) and psychological (brain/mood) parameters in a coordinated manner.

Following supplementation, inflammatory markers showed variable results with some showing a clear anti-inflammatory effect and others showing variable response. Oxidation-Reduction Potential Capacity (ORPc) was enhanced following PFBC supplementation, indicating an improved cellular antioxidant capacity. HRV was improved 11-19%, indicating superior ANS tone and enhanced stress resilience. Psychological Mood State (POMS) parameters showed dramatic improvements following supplementation, with reductions in negative mood states: T (-49%), D (-76%), A (-39%), F (-51%), and C (-62%); with corresponding increases in positive mood states; GM (+23%) and V (+22%).

PFBC supplementation resulted in meaningful “physical” heart benefits and also improved “mental” brain benefits. These data are the first to show that targeted supplementation with PFBC supports the multi-faceted psychophysiological “Heart-Brain-Axis” with simultaneous and coordinated improvements in both physical and mental performance.

Dr. Shawn Talbott integrates physiology, biochemistry, and psychology to help people improve mental and physical performance. He received Bachelor's degrees in Sports Medicine and Fitness Management from Marietta College, Master's degrees in Exercise Science from UMASS and Entrepreneurship from MIT, and his PhD in Nutritional Biochemistry from Rutgers. Recent projects include two academic textbooks, an award-winning documentary film, and several best-selling books translated into multiple languages. His work has been featured on The Dr. Oz Show, the TED stage, and the White House - and has developed numerous top-selling nutraceutical products, generating over \$1 billion in global sales.

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6. Red Palm Oil in Addressing Vitamin A Deficiency: School Program in Malaysia

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Abstract

Vitamin A deficiency and intestinal parasitic infection still coexists among children of aborigines “Orang Asli” and those from rural areas in Malaysia; however current data is inadequate. Current study was carried out to investigate the health status of these children, before and after Vitamin A intervention. A controlled trial with pre-post-test design was carried out in 5 regions in Malaysia (n=10 schools). A total of 651 students were recruited. The experimental arm received biscuits baked with red palm olein while control arm received biscuits baked with palm olein in the form of shortening.

Biochemical assessment included serum retinols, retinol binding protein, beta and alpha carotene, vitamin E, haemoglobin, ferritin, high sensitivity C-reactive protein, fibrinogen and haematology tests. Eyes were examined for ocular signs. Fecal samples were collected for intestinal parasites and gut microbiota analyses. Questionnaires on the demographic, socioeconomic, environmental sanitation, living condition and food consumption were carried out. Upon screening, high prevalence of soil transmitted helminthes: roundworms (*Ascaris lumbricoides*) (20.7%), whipworms (*Trichuris trichiura*) (51.9%) and hookworms (7.7%) were found. Anemia (15.9%), iron deficiency (13%), iron deficiency anemia (6.4%), underweight (33%) and stunting (39%) were also found among these children. Vitamin A deficiency (21%) is classified as public health problem among the rural primary school children at P1 areas in Malaysia. Further analyses are warranted to unravel health impact of the supplementation of red palm olein fortified biscuit on the aforementioned aspects in the vitamin A deficient primary school children.

Dr. Teng has been actively involved in palm oil clinical research since 2007. She has graduated from University of Malaya in biochemistry and subsequently pursued Master in Community Nutrition from UKM and conducted PhD research in Human Nutrition under the scholarship of MPOB. She has been appointed as writer of Malaysian Dietary Guidelines for Children and Adolescents, currently serving as industry representative for Malaysian Dietary Guidelines and technical committee of Malaysian Food Composition Database. She is currently appointed as Group Leader of Diet & Lifestyle, Malaysian Palm Oil Board. Her primary research interests are the relationship between macronutrients – in particular focus on dietary fats with metabolic syndrome, inflammation and obesity. For this, dietary intervention studies are carried out with human volunteers. Studies are designed not only to look at effects, but also to unravel the biochemical and molecular mechanisms, which underlie these effects. In recent projects, nutrigenomics as related to the physiological and mechanistic studies towards personalised nutrition has played a central role to unravel the relation of palm oil consumption in the regions. The functionality of palm oil, in particular red palm oil and its components, is key focus in the evidence-based approach supporting the development of foods, dietary guidelines and health claims towards the future roadmap of individualised nutrition.

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7. Saturated Fats, Whole Foods and Dietary Patterns: Their Impact on Human Health

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Abstract

The effects of dietary saturated fat on cardiovascular health have been studied for more than sixty years. Simple public health messages to minimize and/or limit their intake from the diet have become enshrined in multiple dietary guidelines – yet conclusive evidence to support these recommendations is still lacking, or hotly debated.

Early health messages on reducing saturated fat, paid little attention to their replacement nutrient or to the dietary matrix within which they were consumed. Research studies over the last two decades have revealed that the research underlying saturated fat and cardiovascular health is more complex. It is apparent that the health effects of saturated fat (or any nutrient for that matter) are dependent both on the presence of other nutrients as well as the associated dietary pattern.

In addition to the mix of foods in the diet the effects also depend on the susceptibility of a specific population to disease. Saturated fat within a hypercaloric Western dietary pattern, produces different outcomes than say in a Malaysian population prone to diabetes & metabolic syndrome. Of relevance to palm oil (which is ~ 50% saturated), habitual dietary habits in multiple ethnicities have documented distinct dietary patterns with divergent results on cardiometabolic markers. As “personalized nutrition” becomes routine, future research studies on saturated fat will need to focus on their effects across multiple dietary settings.

Assoc. Prof. Dr. Pramod Khosla has been working on diet and lipoprotein metabolism for almost thirty years. After obtaining his BSc and MSc from Newcastle University in the UK & PhD from the University of Western Ontario in Canada, he did post-doctoral research at Brandeis University in the USA. Dr. Khosla is the author of some eighty plus articles including original research, book chapters, reviews and commentaries. Over the last few years, Dr. Khosla's laboratory has carried out studies in dialysis patients to look at the effects of various supplements (omega-3 fatty acids, tocotrienols) on markers of inflammation, oxidative stress and blood lipids. He is currently the lead investigator on a multi-centered clinical trial involving various dialysis units in Michigan (Henry Ford, Great Lakes Dialysis, Davita) as well as Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM), evaluating the effects of tocotrienol supplementation on lipid, inflammatory and oxidative stress markers. He is also the lead investigator in a collaborative study looking at various aspects of diet on protein energy wasting (PEW) in dialysis patients. This work, in addition to UKM and UPM, involves collaborative centers in the Bangladesh, Saudi Arabia & India. Current research interest relate to the role of diet on lipoprotein metabolism in general and specifically in chronic kidney disease (CKD) patients including those with end renal disease (ESRD) on maintenance hemodialysis. Also interested on the effects of PEW in CKD.

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8. Impact of Dietary Patterns on Cardiovascular Risk Biomarkers - is Food Medicine?

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Abstract

Amongst non-communicable diseases (NCDs), cardiovascular disease (CVD) contributes heavily to mortality. For years CVD prevention in the population advocated saturated fat reduction to target LDL-C lowering. With the clustering of cardiometabolic risk factors within the NCDs, termed as metabolic syndrome (MetS), the public health approach is towards 'whole foods' whilst still emphasizing saturated fat reduction. This centric view on dietary fats is now disputed with evidence suggesting that carbohydrate may perhaps be the culprit in contributing to mortality from CVD.

Dietary risks contribute substantially to the development of the NCDs in the Global Burden of Disease ranking, and this risk is the highest for Malaysia in the South East Asian Region (SEAR). As the Malaysian population largely consumes palm oil, concerns are raised about its contribution to CVD and MetS risks. The diet-disease evidence traditionally addresses single nutrient approaches but examining population diets in the context of heterogeneous dietary habits and ethnicity is vital to generate relevance to dietary messaging in food-based dietary guidelines. A 'meal centric' approach enables identifying dietary patterns within local populations revealing food combinations within dishes and meals, and the 'eating mode'.

Given the knowledge gap between dietary consumption patterns and CVD and MetS risks in the predominantly palm oil consuming Malaysian population, we undertook the Malaysia Lipid Study (MLS) with an urban-living cohort to address key questions related to dietary macronutrients' consumption and their associations with CVD and MetS risks. The primary analysis assessed the pattern of carbohydrate-fat contributions to total daily energy intake from consumed diets. Secondary analyses assessed the diet-food matrix in terms of dietary patterns, to elucidate the 'eating mode' as determined by lifestyle and cultural diversity. This presentation highlights research outputs from the MLS which will inform prevention strategies to drive health promotion inclusive of locally specific personal medicine approach.

Prof. Dr. Tilakavati Karupaiah was formerly Professor and Head of the Dietetics Program, Universiti Kebangsaan Malaysia. She is Strategic Research Interests (SRI) Professor at the School of Biosciences, Faculty of Health & Medical Sciences, Taylor's University. She is Adjunct Faculty at Wayne State University, Detroit, USA. Professionally she is an Accredited Practicing Dietitian (APD) with the Dietitians' Association of Australia. Prof Karupaiah contributes towards legislation, clinical practice, education and research in the field of cardiovascular and renal nutrition in Malaysia. Her agenda is to address 'doable' issues related to prevention of non-communicable diseases such as generating ethnic-based dietary evidence on cardiometabolic risk and technical reports on government performance as well as food industry commitments towards population nutrition and a 'healthy' food environment. Prof. Karupaiah was the recipient of the United States National Kidney Foundation- Council on Renal Nutrition (CRN)'s Joel D Kopple International Award for 2017. She was the 1st Asian to win this award, for which beneficiaries have been nephrologists, dietitians or pharmacists. Prof. Karupaiah has extensive experience in conducting investigator-initiated clinical trials. She holds grants as a primary researcher funded by the Malaysian Government Agencies, the Canadian Government and industry covering national and international research grants. Research collaborations extend to University of Palma, Italy, Monash University, University of Sydney and University of Wollongong, Australia, University of Auckland, New Zealand and Wayne State University, USA.

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9. Palm Oil and Health: An Updated Perspective

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Abstract

Due to its physical and chemical properties, easy availability, and neutral taste, palm oil has been increasingly employed by the food industry in the last decades. However, its high content of saturated fatty acids, which due to their effect on plasma LDL levels are considered to increase the cardiometabolic risk, has led to an intense debate on the possible effects of palm oil, as a component of some industrially produced food, on human health.

The evaluation of the available literature shows that no evidence does exist on specific health effects of palm oil consumption, as compared to other saturated rich dietary fats, within a balanced diet in which saturated fatty acids represent less than 10% of total energy, as recommended by food based guidelines. Within these limits, no negative effect of palm oil consumption on human health (and specifically on CVD or cancer risk) can be foreseen.

Dr. Franca Marangoni has a degree in Pharmaceutical Chemistry and Technology, a PhD in Pharmacology and a PhD in Toxicology. For 15 years, she was a Research Fellow at the Department of Pharmacological Sciences, University of Milan. Since 2004, she has been working for the Nutrition Foundation of Italy as Research Director, where she is in charge of NFI organization and coordination of research projects and scientific communication. Her research interests, as demonstrated by more than 70 publications in International peer reviewed journals, include the correlation between lipid and fatty acid metabolism and diet and lifestyle.

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10. The Trend to Plant-Based Diets and the Contributions of Palm Oil to Biofortification

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Abstract

Nearly 70% of foods and beverages launched over the past five years display a “plant-based” claim. Survey responses indicate about 40% of consumers consider plant-based foods healthier than their conventional counterparts. Despite this consumer trend which is supported by numerous public health organizations, nutrition societies and various forms of dietary guidelines, the actual nutritional contributions remain controversial and often questionable. In light of the dominance of various forms of malnutrition, some suggest a spectrum of technologies represent a new era of nutrition delivery. A 2020 report by CAST (Council for Agricultural Science and Technology) reinforced the potential value of food biofortification in overcoming malnutrition and hunger. Fundamentally, biofortification is a process of increasing the density of minerals and vitamins in a food crop through conventional plant breeding, transgenic techniques, or agronomic practices. This process intends to enrich diets dominated by non-biofortified staple food crops thereby generating measurable improvements in human nutrition and health. For example, nutrition studies with biofortified crops suggest major nutrient deficiencies, such as vitamin A, iron and zinc, may be significantly improved while decreasing related morbidities. Concerning palm and palm kernel oil, and especially about red palm oil, a natural template is apparent for biofortification. As a stable source of β -carotene, tocotrienols, phytosterols, squalene, and coenzyme Q10, palm oil in its various forms may serve as a valuable adjunct in health promotion and management of malnutrition and risk reduction for a spectrum of disease processes. As such, palm oil provides evidence that suggests subtle processing changes could yield products that represent biofortified products with elevated carotenoid content and a fatty acid profile similar to olive oil. While the agriculture community and consumers seek sustainable foods, research on palm oils suggests agricultural and processing interventions, such as biofortification, can be a cost-effective approach for providing foods that are safe, nutritious and economically and culturally accessible.

Dr. Peter Pressman received his medical degree from Northwestern University Medical School and completed residency and fellowship in internal medicine at the University of Wisconsin and Rush-Presbyterian St. Luke's Medical Center. He holds master's Degrees in applied social sciences and clinical psychology from the University of Chicago and Northwestern University, respectively. He has been an Associate Director of the Internal Medicine Residency program at the University of Southern California and while there served as Director of Educational Programs for the Pacific Center for Health Policy and Ethics. Pressman has served as a Naval Medical Officer, and currently writes and consults on public health and nutrition issues for the Daedalus Foundation and for Polyscience Consulting.

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11. Dietary Fats and Current Guidelines: Evaluating the Quality of Evidence

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Abstract

Since 1980, the dietary guidelines within the United States have called for consumers to reduce dietary saturated fat as part of a lifestyle to diminish the risk of cardiovascular disease. This lipid hypothesis was the foundation for the seven-country study conducted in the 1940s and reported two decades later. This work is not without its critics and supporters, yet remains controversial. Numerous clinical trials, observational studies and meta-analyses conducted over the past decade indicate no beneficial effect on health on reducing the risk of cardiovascular disease and total mortality. At the same time, many substitution studies yield different results when assessing the risk of stroke and heart attacks. It remains important to consider foods that represent complex matrices, which contain a vast array of nutrients and even phytochemicals that, if routinely consumed in adequate amounts, may improve health outcomes among some individuals. As risk factors associated with dietary saturated fat remain contentious, the quality and quantity of evidence deserve scrutiny especially when one considers that each fatty acid has unique functions and that not all saturated fatty acids contribute to heart disease.

Dr. Clemens is part-time faculty within USC's School of Pharmacy where he enjoys adjunct appointments as Professor of Pharmacology and Pharmaceutical Sciences and Assistant Professor of Regulatory and Quality Sciences. For nearly 20 years, he has been responsible for courses in food and drug toxicology, food science, regulations of foods and dietary supplements. He developed and instructed graduate global nutrition courses within the USC School of Medicine. He served as Scientific Advisor for Nestlé USA for several decades prior to being recruited to join the faculty at USC. He is a past president of the Institute of Food Technologists (IFT) and is the current presiding officer (aka President) of the International Academy of Food Science and Technology. He co-founded, established and contributes to a Food, Medicine and Health column published monthly in Food Technology for the past 15 years. He continues to serve on several editorial boards (e.g., Food Chemical Toxicology, Journal of Food Science, Toxicology Research and Applications, Journal of Dietary Supplements) and continues to serve as a reviewer for many high-impact journals. Dr. Clemens has published > 50 original manuscripts and commentaries. In addition, he has presented more than 250 invited lectures at domestic and international scientific conferences. He is an elected Fellow in four scientific organizations, including ASN where he served in several critical positions. Dr. Clemens' experience in the global nutrition arena spans more than 40 years that include countries such as South Korea, Argentina, Ecuador, Ethiopia, and Kenya. One of his current projects is directed to developing modular hospitals in Libya with electronic diagnostics linked to medical and nutrition support teams in the United States. Dr. Clemens served on the 2010 US Dietary Guidelines Advisory Committee.

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12. A Rigorous Assessment of the Myth That Consumption of Saturated Fat Increases Risk of Coronary Heart Disease

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Abstract

From its origin in the 19th century to the middle of the 20th century, the low carbohydrate diet dominated clinical approaches toward the treatment of obesity and type 2 diabetes. Observations of health care providers documented the health benefits of diets which were high in fat and low in sugar, with an emphasis on healthful food such as beef, butter, cheese and tropical oils. However, flawed, deceptive and biased research, which began in the middle of the 20th century, led to the promulgation of the myth that low fat, low cholesterol, meat-restricted diet promotes good health. An extension of this myth was the claim that consumption of tropical (coconut, palm) oils would elevate cholesterol and thereby cause heart disease. This dark time in nutritional research was based on poorly conducted epidemiological research, government intervention and industry-based financial conflicts of interest. In recent decades, high caliber dietary studies have demonstrated that the low carbohydrate diet is the ideal treatment for obesity and type 2 diabetes, and further, optimizes biomarkers of cardiovascular disease. This talk will provide a review of evidence-based research documenting the great value of the low carbohydrate, high-fat diet for optimizing metabolic health. Overall, I will address the finding that the excess consumption of food that raises serum glucose (e.g., potatoes, bread and sweets), rather than food rich in saturated fat, such as tropical oils, is the basis of the current worldwide epidemic in obesity, heart disease and type 2 diabetes.

Prof. Dr. David Diamond received his Ph.D. in Biology in 1985 from the University of California, Irvine. He was a career scientist at the Department of Veterans Affairs for 30 years and is currently a Professor in the Department of Psychology, Cognitive, Neural and Social Science Division, at the University of South Florida. Dr. Diamond has been funded by the VA, NIH, DoD, NSF and pharmaceutical companies in his neuroscience research, with over 100 publications on the brain and memory. In the past decade, Dr. Diamond has expanded his research program to address controversial issues in obesity, cardiovascular disease and nutrition. In recognition of the importance of his work to global healthcare, he has been invited to present his research at numerous domestic and international nutrition, cardiology, obesity and diabetes meetings.