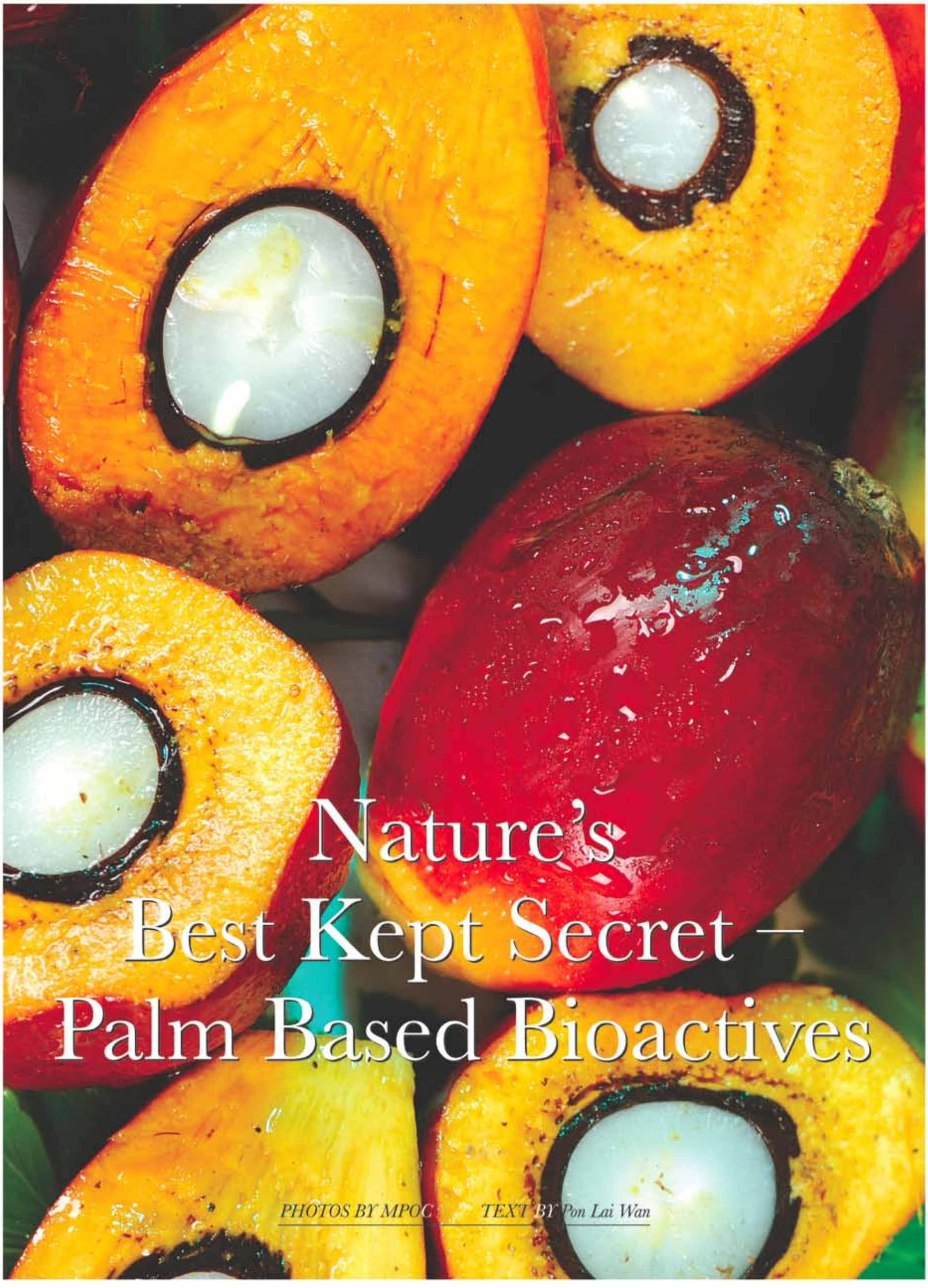

Nature's Best Kept Secret — Palm Based Bioactives

PHOTOS BY MPOC *TEXT BY Pon Lai Wan*

Bioactives in nutraceuticals and cosmeceuticals play an important role in enhancing health as well as disease prevention and they are currently purported as major contributing factors to a healthy lifestyle. There is an increasing trend towards plant bioactives as alternatives to medication. Hence, bioactives with promising nutraceutical and economic potentials have raised interest in the market place.

Did you know that such valuable antioxidants are available abundantly in oil palm fruits (refer to Table 1)? Oil palm fruits are packed with various phytonutrients ranging from vitamin E, carotenes to phenolic antioxidants. These bioactives extracted from oil palm fruits have been researched intensively and are supported by scientific evidence for their health benefits which include prevention of cardiovascular diseases, cancer, and other degenerative diseases. Encapsulated vitamin E extracted from palm oil, palm carotenoids complex and supplements enhanced with palm antioxidants is presently available in the global nutraceuticals market. Malaysia exported some USD20 million worth of palm oil health supplements, mainly to Europe, the US, Canada and Japan. Currently, Malaysia is the biggest vitamin E tocotrienol producer and exporter in the world.

Palm Phytonutrients	Amount (ppm)
Carotenoids	500 – 700
Vitamin E (predominantly Tocotrienols)	600 – 1000
Sterols	60 – 620
Squalene	200 – 500
Co-enzyme Q10	10 – 80
Glycolipids	1000 – 3000
Triterpene alcohol	40 – 80

Table 1: Phytonutrients found naturally in Palm Fruits

Palm oil is nature's richest source of vitamin E-tocotrienols. These are surprisingly not found in most vegetable oils commonly consumed such as soybean, corn, canola and sunflower oils (refer to Table 2). Tocotrienols constitutes 66 – 79% of the vitamin E (total 600 – 1000mg/kg of palm vitamin E) in crude palm oil. The remaining are tocopherols. Commercially, tocotrienols are mostly extracted from palm oil, with rice bran oil a far second. In the past, vitamin E-tocopherol was the attention of research and it is the most common form of vitamin E used in supplements and in the European and American diet. However, nowadays much interest has been focused on tocotrienols as these vitamin E species possess powerful antioxidant properties and portray other important biological activities which are not shared by tocopherals. Tocotrienols have 40 – 60 times the antioxidant effects of alpha-tocopherol and this is believed to be the key attribute of tocotrienols contributing to its positive health attributes, particularly in the areas of cardiovascular, cancer and skin health.

Oils	Tocopherols	Tocotrienols
Palm	133	1015
Rice bran	311	308
Soyabean	1162	-
Olive	100	-
Corn	603	-
Rape (Canola)	271	-
Sunflower	636	-

Table 2: Tocotrienols in Edible Oils Ref: Ong, A.S.H (1993), Natural sources of Tocotrienols. In Lester Packer & Jurgen Fuchs (eds), Vitamin E in health and disease. Mercel Dekker, Inc: New York.

It has been widely known that carotenoids play an important role as a precursor of vitamin A and amongst the convertible carotenoids, β-carotene is the most efficient. Many may not know that crude palm oil has the highest β-carotene content as compared to the available plant sources. The content of carotenes per kilogram in crude palm oil is reported to be 15 times more than in carrot! Crude palm oil contains 500 – 700mg/kg of mixed carotenes (refer to Table 3). 90% of these carotenes are β-carotene and α-carotene, while remaining is made up mostly of lutein, lycopene and zeaxantin. Palm β-carotene has higher bioavailability than that obtained from other rich vegetative sources and demonstrates no toxicity unlike hypervitaminosis A due to preformed vitamin A intake. Such concerns do not arise from the intake of β-carotene from natural sources such as red palm oil. Among the proven and reported health benefits of long term intake of red palm oil are increases in the vitamin A status of pregnant and lactating mothers and breast-fed infants. For example, one popular brand of red palm oil, called Carotino has obtained various endorsements for its health attributes.

Besides the oil, by-products of palm oil milling and refining also contain bioactives. These are water-soluble vitamins that have been successfully extracted from aqueous by-products generated from the palm oil mill. As these palm phenolics are potent antioxidants, they have been associated with a number of health benefits. Anti-oxidative effects of palm phenolics were reported to be comparable to that in green tea. Recent scientific findings demonstrated that these valuable active compounds play a promising role in lowering cholesterol and prevention of arthrosclerosis, cancer, and skin related photo-oxidative damage.

Presently, phenolic-rich compounds are expensive due to inadequate worldwide supply. Palm phenolics which could be recovered abundantly from palm 'waste', could become an abundant source of these phenolics. In conclusion, due to its wide range of bioactives with superior antioxidant properties, palm oil is the currently earmarked for various applications ranging from functional foods to nutraceuticals, pharmaceuticals and cosmeticeuticals.

Palm oil has a history of food use of over 5000 years and has emerged as a preferred oil of this millennium by billions all over the world. More than 150 countries worldwide favour it for its natural, versatile and excellent properties. To those who wish to reap the benefits of this oil and its products, the Malaysian Palm Oil Council (MPOC) will be your trusted information provider. Please visit MPOC's website at ***www.mpoc.org.my*** for more information.

Carotene	Refined Red Palm Oil (%)	Crude Palm Oil (%)
β-carotene	47.4	56.0
ά-carotene	37.0	35.1
Cis-ά-carotene	6.9	2.5
Phytoene	2.0	1.3
Lycopene	1.5	1.3
Phytofluene	1.2	0.1
γ-carotene	1.3	0.7
Cis-β-carotene	0.8	0.7
δ-carotene	0.6	0.8
ζ-carotene	0.5	0.3
Neurosporene	trace	0.3
β-Zeacarotene	0.5	0.7
α-Zeacarotene	0.3	0.2
Total	545	673

Table 3: Carotene Composition of Refined Red Palm Oil and Crude Palm Oil
Ref: Ooi et al. (1994), Recovery of carotenoids from palm oil. JAOCS. 71(4):423-6.