



## Dietary Fatty Acids and Edible Fruit Oil: Potential Therapy for Heart

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**Abstract** – Cardiovascular disease (CVD) is a major cause of disability and premature death throughout the world. This disease is commonly experienced by people with unhealthy lifestyle, stress and physical inactivity. Cholesterol has received the most attention as single risk factor of CVD. Reducing the intake of cholesterol, saturated fat, and *trans* fatty acids may be beneficial, yet controversy is still lingering to what constituents more beneficial dietary fats. The purpose of this article is to give an overview on the impact of major dietary fatty acids on cardiovascular morbidity and mortality and to give an insightful information regarding fatty acids composition in selected fruits oils in search for novel oils as potential therapy against CVD.

**Keywords:** Cardiovascular disease, dabai oil, dietary fatty acids, fruit oil, olive oil, palm oil.

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### Introduction

Cardiovascular disease (CVD) is a multifaceted issue and the leading cause of death around the globe. Alarming statistics revealed that death caused by CVD are 17.3 million deaths per year, comprising 31.5% of total global deaths in 2013 (Sacks et al., 2017). Most often, atherosclerosis is cited as the underlying causes of CVD. (Salter, 2013). Atherosclerosis is a progressive thickening and loss of elasticity of the artery wall due to the accumulation of lipids which primarily cholesterol ester, connective tissue and latter stages, calcium (Mangiapane & Salter, 1999; Salter, 2013). The strategy to combat the risk of CVD by reducing the dietary saturated fat was initiated by American Heart Association (AHA) ever since 1961. The scientific rationale that founded the recommendation introduced by AHA are based on a well-established effect of saturated fat in raising the low-density lipoprotein (LDL), a leading cause of atherosclerosis (Sacks et al., 2017). Vast effort is needed to create and initiate preventive treatment that can substantially reduce, nationally and globally, the number of people who develop CVD even a small percentage.

The consumer demands for novel edible oils with desired physicochemical properties and potential health benefits for different applications have driven the characterization and development of new edible oils. Fruit oils may serve as speciality oils for health promotion and disease prevention due to their special fatty acid composition and other beneficial components (Yu et al., 2006). Nowadays, the search for new sources of fats and oils is an enduring process. By far, plant seed are noted as the most promising sources of oil for nutritional, industrial, and pharmaceutical purpose. The potential supply of lipid material from fruits may be enormous and should be investigated. Palm oil, palm kernel oil as well as olive oil are some example of commercially successful extracted oil (Chow, 2008).

Developing countries that are unable to fulfil their edible oil requirements for somewhat lack of currency to purchase commercial oils may benefit from indigenous oil-yielding plant sources. New sources of oil and fat could supplement conventional supplies or perhaps even replace imports. An adequate supply of fats and oils may help in improving nutritional status of the population (Kamel & Yukio, 2008), and it is for this reason that the search for new sources of novel oils is so important. In

Malaysia, several small-scale enterprises have emerged and became front-runners in developing dabai-based products. Local commercialization of dabai, *Canarium odontophyllum* is promising and plausible to be successful in the near future.

### **Impact of Dietary Fatty Acids on Cardiovascular Morbidity and Mortality**

Hyperlipidemia has been claimed as the major risk factor for atherosclerosis. The incident of hyperlipidemia is associated with elevated plasma levels of cholesterol, cholesteryl esters, and triglycerides. These lipid components are transported into the circulatory system in association with proteins, phospholipids, and carbohydrates in various micelle form-chylomicrons (CM), very low density lipoprotein (VLDL), intermediate-density lipoprotein (IDL), LDL, HDL, lipoprotein (a), and various micelle remnants. Individual with premature CVD exhibit some of the following: 1) increase LDL levels; 2) increased cholesterol and triglycerides, primarily in VLDL; and 3) increase triglycerides with normal cholesterol primarily as VLDL (Chow, 2008). It was somewhat accepted that dietary fat quantity and composition may leave impact on the concentration of plasma lipoprotein cholesterol. However, there are still an ongoing debate and speculation regarding the role and position of dietary fat on actual CVD morbidity and mortality (Salter, 2013).

Looking onto the study conducted by Jakobsen and co-author (2009), where they used the data obtained from 11 European and American studies in effort to elucidate that replacing saturated fatty acids with monounsaturated fatty acid and polyunsaturated fatty acids may prevent coronary heart disease (CHD). In this meta-analysis, the study reported 5249 coronary incident and 2155 coronary death. This events were obtained from 344 696 people followed-up for 4 to 10 years. Major conclusion from the study can be drawn as replacement of 5% of saturated fatty acids with polyunsaturated fatty acids rather than monounsaturated fatty acids or carbohydrates may prevents CHD over a wide range. Further, study conducted by Mozaffarian and colleague (2010), was in agreement with study conducted by Jakobsen and co-author (2009). In the meta-analysis study, the researcher investigating eight randomized control trials involving 13 614 participants and including 1042 coronary heart disease incident. They had come with an estimation that 10% reduction in coronary heart disease risk is possible with 5% of increased energy from polyunsaturated fatty acids. Further they summarized that replacing saturated fat with polyunsaturated fatty acid would significantly reduce the rates of coronary heart disease consequently, specifically addressing the value of polyunsaturated fatty acids.

Skeaff and Miller (2009) reviewing 26 cohort analyses and 9 randomized control trials in analysing the impact of dietary fat including total fat, saturated fatty acid (SFA), trans-fatty acid (TFA), monounsaturated fatty acid (MUFA), and polyunsaturated fatty acids (PUFA) and long chain n-3 PUFA on CHD mortality. On reviewing the cohort studies, they revealed that there were no association between CHD with total fat, SFA and MUFA. On the contrary, there were strong and positive association between CHD with TFA. Additionally, there were negative association between CHD with long chain n-3 PUFA originated from fish. However, the data on the total of PUFA intake were inconsistent with a significant increase in CHD death in those individuals who consuming the highest intake, but in paradoxically a significant reduction in CHD events associated with a 5% increase in PUFA intake. Additional note was written stated that high intake of long chain n-3 PUFA or fish was strongly associated with reduced CHD mortality. As the authors analysing the randomized control trials, they stated that CHD mortality was not associated with total fat intake, PUFA/SFA ratio or long chain n-3 PUFA intake. Furthermore, CHD incident were significantly reduced by high intake of PUFA/SFA ratio and long chain n-3 PUFA.

Back in 2010, Siri-Tarino and co-author (2010a) were trying to find an association between dietary saturated fat intake with the risk of CHD and stroke. The team analysed 21 prospective epidemiological studies, and the overall analysis included 347 747 subjects of whom 11 006 developed CHD or stroke over a 2 to 23 years of follow-up. It was stated in the investigation that there were no significant evidence to conclude that dietary SFA is associated with the risk of CHD, stroke or total CVD. However, the result from this multi-variate study has evoke disagreement among researcher. Salter, (2013) deemed the study to be perhaps provocative and debateable. According to

Scarborough et al. (2010b), almost half of the studies included adjustment for serum cholesterol concentration, therefore the data fails to support the author conclusion. Additionally, Katan et al. (2010) criticized the study due to the fact that 1-day diet diaries used in the studies to estimate dietary intakes. As a point of retribution to the critic, the author Siri-Tarino et al. (2010b) providing additional analysis by excluding the adjusted serum cholesterol studies and stressed out that the result from previous study are still valid. Another validation study by Siri-Tarino et al. (2010c) in reply to Katan et al. (2010), the author argue that the result in the study had accounted for by deriving quality score for the component studies thus, reemphasize that the evaluation did not change their findings.

A further review of the impact of reducing or modifying dietary fat was published by Hooper et al. (2011). In the review, the author included 65 508 participants from 48 randomly controlled trials. In addition, the author also looked at the influence of altering dietary total fat, SFA, MUFA, PUFA and TFA intake on cardiovascular morbidity and mortality. The primary conclusion drawn revealed that long-term, which is duration of greater than 2 years in reduction of SFA intake was associated with a significantly 14% reduced cardiovascular risk. Later, further analysis proposed that the significant reduction of cardiovascular risk was specifically associated with substitution of SFA with unsaturated fatty acids rather than replacement with carbohydrates. Additionally, the 14% reduced risk was associated with a reduction in total and/or LDL cholesterol. However, the author was unable to highlight whether MUFA or PUFA were more beneficial.

The multifactorial nature of occurrence of CVD highlights the difficulties, conflicting and challenging outcomes for the previously mention studies. Despite the limitation however, the diet-heart hypothesis was often used in explaining the link between the intake of dietary fat, plasma cholesterol and risk of CVD. The Seven Countries Study, investigated and led by Ancel Keys is frequently credited as one of the earliest human epidemiological studies to support this link in human (Keys et al., 1966; Salter, 2013). The study had succeeded in developing strong inter-correlation between dietary SFA intake, plasma cholesterols and CVD mortality. Mutually, Hegsted et al. (1965) conducted similar studies with minor quantitative differences however, acquire similar major conclusion namely: 1) dietary cholesterol has a relatively modest plasma cholesterol-rising effect, 2) dietary SFA have potent plasma cholesterol-rising effect 3) dietary PUFA have plasma cholesterol-lowering effect and 4) cholesterol-rising effect of dietary SFA is more potent than lowering effect of PUFA. Therefore reducing dietary SFA intake has remained the cornerstone of public health nutrition policy for reducing risk of CVD ever since (Salter, 2013).

### **Edible Fruit Oil**

No oil from any single sources has been found to be suitable for all purpose, since different type of sources whether fruit or vegetable showed different type of fatty acids composition. The application of an oil for a particular purpose, however is determined by its fatty acids and triglyceride composition (Hirsinger, 1989). Chow (2008) stated that the mesocarp or pulp of any fruits generally contains very low levels of lipid material notably around 0.1% - 1.0%. Additionally, the stated part does not constitute an important sources of edible or industrial fats and oil. Yet, olive and palm are few known exceptions.

#### *Olive Oil: the Ancient Oil*

Olive oil which has been used since ancient times and this oil was obtained from the fruit of an evergreen tree called *Olea europea*. Virgin olive oil contains two main fractions, which are the oil or saponifiable fraction and unsaponifiable fraction. Saponifiable fraction contained triacylglycerols, diacylglycerols, monoacylglycerols, free fatty acids and phospholipids, and these compounds contributes to 98.5 %-99.5 % of the oil chemical composition. Meanwhile, unsaponifiable fraction reported to consist of hydrocarbons, tocopherols, coloring pigments, sterols, phenols, triterpenes and other compounds and these compounds contribute to 0.5 % to 1.5 % of the oil composition. The olive oil triacylglycerol is the most common monounsaturated fatty acids (oleic acid), together with small amounts of saturated and significant amounts of polyunsaturated fatty acids (mainly linoleic acid) (Aparicio et al., 2000).

Today, the parameters of quality and biological value of olive oil may depend on the fatty acid composition, the ratio of polyunsaturated to saturated fatty acids, ratio of omega-6 and omega-3 fatty acids, the amount of total phenols, the ratio of total phenols and polyunsaturated fatty acids, sterol composition, free acidity, peroxide value and sensory evaluation. It was reported that extra virgin olive oil showed high content of oleic acid and also contains polyunsaturated essential fatty acids, linoleic and linolenic. Interestingly, the essential ingredients of olive oil can be found in unsaponifiable part which consists of, up to now, about four hundred identified compounds (Gugić, 2010).

Lauric, myristic, palmitic, stearic, arachidic, behenic and lignoceric are the type of saturated fats that are reported to present in olive oil. Additionally, Šarolić (2014) also reported that unsaturated fatty acids are an important factor by which the olive oil is distinguished from other fats. Oleic acid (18:1 n-9), is the most common monounsaturated fatty acid in olive oil is oleic acid and this fatty acid constitutes about 55-83 % of total fatty acids. It has a great biological nutritional value and is easily digestible. That's why olive oil is a representative of the oleic acid oil group (Šarolić, 2014). Besides oleic acid, olive oil contains other polyunsaturated fatty acids such as palmitoleic acid, gadoleic acid, and these fatty acids represented in a very small quantity which is up to 0.5 % of the total amount of fatty acids. Additionally, it was mentioned that the most important essential fatty acid in olive oil are linoleic (18:2, n-6), in an amount of 3.5 to 21 %, and linolenic acid (18:3, n-3) in an amount up to 0.9 % (Boskou, 2006).

Studies have reported towards a beneficial effect on health from an olive oil rich diet on the incidence of cardiovascular diseases. Interestingly, dietary interventions were conducted on a large cohort and revealed the effect of olive oil in improving the disease risk marker. In the PREDIMED dietary intervention trial, it has been demonstrated that olive oil which incorporated in the Mediterranean diet possess beneficial properties for cardiometabolic factors. The factors were stated as blood pressure, glycaemia, dyslipidemia by (decreasing triacylglyceride increasing HDL-cholesterol and lowering total and LDL-cholesterol) and additional risk factors such as oxidative stress (by reducing susceptibility of LDL to oxidation) and inflammation (by decreasing pro-inflammatory markers such as C-reactive protein and IL-6) (Salas-Salvado et al., 2008).

Captivatingly, all these findings in large cohort studies are reported consistent with the protective role of olive oil consumption on health. Covas et al. (2006) reported that the role of minor phenolic fraction was evidenced in the EUROLIVE controlled study where the improvement of the lipid profile is linked to increasing phenolic content. Meanwhile, Greek European Prospective Investigation into Cancer and Nutrition (EPIC) study showed that olive oil intake was inversely associated with both systolic and diastolic blood pressure (Psaltopoulou et al., 2004). Additionally, Bondia-Pons et al. (2007) suggested that moderate consumption of olive oil was as an effective recommendation to reduce systolic blood pressure in healthy men who do not typically consume a Mediterranean diet.

Elsewhere, the biggest studies were carried out in Southern European countries. The association between olive oil intake and all-cause as well as cause-specific mortality was studied in the Spanish population. Result stated that greatest reduction in risk was observed for CVD mortality. This amounted to 44% for the highest olive oil quartile of consumers in comparison with non-consumers. Additionally, a gradual increased intake of olive oil was associated with a decreased risk of CVD mortality (each 10 g per 2000 kcal increase was linked to a 13% decrease in risk) (Buckland et al., 2012).

In two prospective studies, an attentive comparison between the incidence of coronary heart disease (CHD) and the level of olive oil consumption was conducted. Large cohort of Italian women study (EPICOR STUDY) reported that a significant reduction in CHD risk (-44%) was associated with the highest quartile of olive oil consumption compared with the lowest one (> 31, 2 g/d versus ≤15 g/d) (Bendinelli et al., 2011). Meanwhile, Buckland and colleague (2012) reported that the Spanish cohort taken from the European Prospective Investigation into Cancer study, a more modest reduction of CHD (-22%) was observed in the upper quartile consumers (> 28.9 g/d). Notably, there was a 7%

reduction in CHD risk for each 10g/d per 2000 kcal. Additionally, in the Three-City Study conducted in France, participants who used olive oil intensively had a 41% lower risk of stroke than those who never used it (Samieri et al., 2011). As a point to taken, these prospective studies confirmed the cardiovascular protective effect of olive oil previously reported in case-control studies (Bertuzzi et al., 2002; Fernandez-Jarne et al., 2002; Kontogianni et al., 2007).

#### *Palm Oil: the Major Oil*

Vegetable oils has now become a worldwide phenomenon and this scenario has led to a high demand of edible oils. In search for the sources of edible oils, palm oils contribute significantly for the global supply of edible oils (Mancini et al., 2015). The palm tree *Elaeis guineensis*, is a native tropical plant to many West African countries. The local population used the palm oil as a traditional cooking oil. Palm oil has now spread to tropical and subtropical zones in the world. Southeast Asia, including Malaysia and Indonesia are the leading producers of palm oil which accounted for 86% of global production (Mancini et al., 2015). Palm oil can be produced into two distinct types which are palm kernel oil extracted from seeds and palm oil which extracted from the palm mesocarp. These palm oil were reported to contained healthy beneficial compounds, such as triacylglycerols (TAGs), vitamin E, carotenoids and phytosterols. (Mba et al., 2015).

Previous studies reported that crude palm oil contained high carotenoids, which accounted for 500-700 ppm (Edem, 2002; Obibuzor et al. (2012); Sambanthamurthi et al. (2000); Sundram et al. (2003). Additionally, palm oil rich in  $\gamma$ -tocotrienol.  $\gamma$ -tocotrienol contributes to palm oil stability as they delay the time of oxidation in the oil which proceeded far enough to produce noticeable off-flavours and/or odours (Edem, 2002). Furthermore, they possess free radical scavenger properties that play a key role in fighting reactive oxygen species, playing role against aging, CVD as well as cancer (Edem, 2002; Ong & Goh, 2002; Sen et al., 2007).

In the edible oil industry, the palm oil will be considered as high-quality oil if only the palm oil contained low amounts of free fatty acids (FFAs), low impurity content and good bleaching. Meanwhile, the low quality oil often used in the non-edible oil industry such as biofuel, candles, cosmetics and soap production (Henson, 2012). Importantly, the high quality of palm oil should constitutes of more than 95% neutral triacylglycerols (TAGs, or triglycerides), and should less than 0.5% of free fatty acids (Dunford, 2012; Gunstone, 2011).

According to Mancini et al. (2015), 85% of palm kernel oil are made of saturated fatty acids and mainly consist of lauric acid and myristic acid. In the other hand, palm oil contains 50% of saturated fatty acids and mostly consist of palmitic acids (PA, 44%) and showed lower amount of stearic acid (5%) (Sambanthamurthi et al., 2000). Monounsaturated fatty acids were also found in the palm oil which made for about 40% and mostly oleic acids, and 10% of polyunsaturated fatty acids, which mostly made of linoleic acid (Edem, 2002; Gee, 2007; Sambanthamurthi et al., 2000).

The effect of palm oil consumption has been reported by Zhang et al. (2003), where the authors assessed the effect of palm oil used in Chinese diets in comparison to soya bean oil, peanut oil and lard. In this research, they reported that, palm oil in diet significantly reduced the levels of cholesterol in the serum of subjects who had normal serum cholesterol levels at baseline. Additionally, palm oil significantly reduced the TC/HDL ratio among those who were hypercholesterolemic. However, Zhang et al. (2003) also stated that the Chinese diet contains less animal protein and cholesterol compared to typical “western” diets. This may have influenced their results, limiting their generalizability.

Further, Chen and colleague (2011) conducted a multi-country analysis to evaluate the effect of palm oil consumption on CVD mortality risk due to ischemic heart disease and stroke. The author investigated the effect by analysing twenty-three countries and dividing them into high-income countries and developing countries. The researcher summarized that every additional kilo of palm oil consumed per-capita annually will led to higher ischemic heart disease in developing countries with respect to high-income countries. Similar result were found in the stroke incident, however it were

found that the data were not statistically significant, suggesting that serum LDL-C is not strictly linked to hypertension.

Fattore and colleague (2014) conducted a systematic review and meta-analysis of 51 human dietary intervention trials. In this review, they analysed the comparison in which palm oil was substituted for diets rich in polyunsaturated fatty acids (PUFAs), stearic acid and monounsaturated fatty acids (MUFAs). They reported that serum lipid profile was beneficially altered with diets containing palm oil compared to myristic and lauric acid yet, the findings were not consistent with the case when comparison were made to PUFAs and MUFAs. In addition to the findings, there were no significance result reported in young people and also those subjects that had overall lower energy intake from fat. The diets rich in palm oil did not significantly change the TC/HDL or LDL/HDL cholesterol ratios. Further, palm oil rich diets were reported to significantly increased the levels of apolipoprotein A-I and HDL cholesterol and reduced the levels of TC/HDL, triacylglycerols and apolipoprotein B when compared to *trans* fatty acid-rich diets.

Unfortunately, CVD represent the main cause of death worldwide. Kronenberg et al. (1999) and Walldius et al. (2004) stated that the main CVD related biomarkers are serum or plasma TC, LDL-C, high density lipoprotein (HDL-C), TAGs and very low-density lipoprotein cholesterol (VLDL-C). Additionally, apolipoprotein A-I (apo A-I) and B (apo B) also reported to reflect variations in HDL-C and LDL-C. Particularly these apolipoprotein are associated with increased CVD and also considered with good CVD predictor factor. As such, controversies emerges stating the potential unhealthy effects of palm oil due to the high palmitic acid content. Moreover, the link between palm oil consumption and CVD risk was claimed to be the palmitic acids content in palm oil (Mancini et al., 2015).

#### *Dabai Oil: the Lesser Known Oil*

*Canarium odontophyllum* Miq. also known as dabai fruit among local people in Sarawak is a *Canarium* species from Bruseraceae family. Chinese olive (*Canarium album*), Galip (*Canarium indicum*), Pili (*Canarium ovatum*) and African black olive (*Canarium sweinfurthi*) are among the most studied species. Due to its resemblance in physical appearance, texture and flavour with olive, dabai often noted as “Sarawak olive”. Nowadays, this underutilized dabai (*Canarium odontophyllum* Miq.) fruit become the most promising and sought after species due to its nutritional, phytochemical and pharmacological properties (Tan & Azrina, 2016) in Malaysia.

As stated by Tan and Azrina (2016), the main active fatty acids founds in dabai pulp and kernel oils are palmitic (16:0), oleic (18:1) and linoleic (18:2) acids. Additionally, Azrina et al. (2010b) investigated the fatty acids composition of olive oil, palm oil and dabai oil (pulp and kernel) oils, and it were observed that the fatty acids composition of palm oil and dabai oil were interestingly similar. Both of these oils have approximately 40% SFAs and MUFAs as well as about 12-13% PUFAs. Palm oil contain high amount of SFAs and MUFAs and therefore, making it suitable to be used as cooking oil as it stable against oxidation and possess prominent frying quality (Ong & Goh, 2000). It is plausible that dabai pulp oil could be developed as cooking oil (Tan & Azrina, 2016). Azrina et al. (2010b) and Shakirin et al. (2012b) both reported that the fat content in dabai is greater than olive and avocado oil, PUFAs of dabai oil were the same with avocados oil (Takenaga et al., 2008) with range of 12-14%, yet found to be different with olive oil with range, 3.5-21.5% (Milosevic et al., 2002). In the other hand, the MUFAs of dabai pulp oil (42%) were somewhat lower when compared with olive oil (56-86%) (Milosevic et al., 2002) and avocado oil (65-68%) (Takenaga et al., 2008).

Azrina et al. (2010b) and Shakirin et al. (2012b) reported that dabai kernel oil can be classified as saturated fat-rich oil as its SFAs (56-60%) was higher than MUFAs and PUFAs but the amount of SFAs was lesser than coconut oil at percentage of 70%. The amount of MUFAs in dabai kernel oil was reported to have higher content than corn oil (26.5%) and soybean oil (22%). Additionally, the amount of fatty acids in dabai kernel oil was also comparable with cocoa butter (SFAs: 60%, MUFAs: 36-37% and PUFA: 3%). Interestingly, dabai kernel oil contains less dangerous SFA such as myristic acid (14:0).

Research conducted by Chua et al. (2015) in differentiating the fatty acids composition among six different genotypes of dabai fruit, reported that linoleic (18:2) and linolenic (18:3) were found abundantly in the dabai pulp oil. Interestingly, *Bulat* genotype showed superior high PUFAs (29.54%) and MUFAs (48.58%) value, and 21.89% of SFA as compared with other genotype. Elsewhere, it was reported that the SFAs were almost three folds greater than the *Bulat* genotype (Azrina et al., 2010b; Shakirin et al. 2012b). These finding is a valuable information in developing the kernel of *Bulat* genotype as natural fruit oil for pharmaceutical and food industries.

Dabai oil were reported to showed potential health benefit which offer hypocholesterolemic effect by lowering plasma triglyceride, total cholesterol and LDL levels, and increasing plasma HDL level. Shakirin et al. (2012a) reported the effect of dabai (kernel and pulp) oil supplementation on lipid profiles of healthy rabbits. They stated that supplementation of dabai pulp oil at a dosage of 2 % in the diet exhibited significant increment of TC and HDL-C values as well as significant reduction of LDL-C and TG values. Additionally, they also reported that supplementation of 2% kernel oil in the diet appeared to have a significant reduction of TC value, but no significant effect on LDL-C, HDL-C and TG values. They summarized that dabai pulp oil is more effective in improving the lipid profile of healthy rabbits compared to dabai kernel oil. Even though dabai oil may possesses therapeutic effects, these fruits are harvested by the local community and only sold in their market. Additionally, dabai fruit remains unfamiliar to people outside Sarawak possibly due to its lack of promotion hence, the economic potential has not been fully explored. Production of dabai pulp oil is still relatively new in Malaysia. Hence, there is a scientific need in exploring and promoting the potential of dabai as a new source of healthy alternative fat.

### **Conclusion**

Cardiovascular diseases (CVDs) remain the biggest cause of deaths worldwide and addressing CVDs require concrete and continuous action, simultaneously, wide and new measures of preventive action are required for this alarming situation. Saturated fatty acids are associated with an increased risk of coronary heart disease. Consumption of monounsaturated fatty acids and polyunsaturated fatty acids are associated with a decreased risk of coronary heart disease. The consumer demands for novel edible oils with desired physicochemical properties and potential health benefits for different applications have driven the characterization and development of new edible oils. Fruit oils may serve as speciality oils for health promotion and disease prevention due to their special fatty acid composition and other beneficial components. Interestingly, local commercialization of dabai (*Canarium odontophyllum*) an underutilized fruit is expected to increase in the near future. Therefore, dabai is reasonable and worthwhile to be investigated and developed as new beneficial therapeutic oil.

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