Output จากโครงการวิจัย

1. ผลงานตีพิมพ์ในวารสารวิชาการนานาชาติ
    - อยู่ในระหว่างการเขียน manuscript
2. การนำผลงานวิจัยไปใช้ประโยชน์
    - เมื่อผลงานวิจัยได้ถูกเผยแพร่ออกไป คาดว่าน่าจะก่อให้เกิดประโยชน์ทั้งในด้านการเพิ่มมูลค่าทางเศรษฐกิจของน้ำมันมะพร้าวและชาวสวนผู้ปลูกมะพร้าวมีรายได้เพิ่มขึ้นจากการจำหน่ายมะพร้าว ทำให้มีคุณภาพชีวิตที่ดีขึ้นและลดค่าใช้จ่ายในการรักษาพยาบาลจากการลดความเสี่ยงในการเกิดโรคหัวใจและหลอดเลือดจากการรับประทานน้ำมันมะพร้าว
    - ได้ความรู้ทางวิชาการเพื่อการเรียนการสอนและการวิจัยถึงประโยชน์ของน้ำมันมะพร้าวในด้านการลดความเสี่ยงต่อการเกิดโรคหัวใจและหลอดเลือด
    - มีการแลกเปลี่ยนความรู้ทางวิชาการในระหว่างการประชุมวิชาการ ("นักวิจัยรุ่นใหม่ พบ เมธีวิจัยอาวุโส สกว." ครั้งที่ 10") ทำให้มีผู้สนใจที่จะนำความรู้นี้ไปพัฒนาวิจัยต่อยอดให้เกิดประโยชน์อื่นๆต่อไป
3. มีการนำเสนอผลงานในการประชุม "นักวิจัยรุ่นใหม่ พบ เมธีวิจัยอาวุโส สกว." ครั้งที่ 10" ระหว่าง วันที่ 14-16 ตุลาคม 2553 ณ โรงแรมฮอลิเดย์อินน์ รีสอร์ท รีเจนท์ บีชชะอำโดยมีบทคัดย่อและ poster presentation ดังแสดง

The Effect of Daily Consumption of Virgin Coconut Oil on Plasma Lipoproteins Levels in Healthy Thai Volunteers

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Abstract

The effects of dietary supplementation with virgin coconut oil on lipid profiles in Thais have not been demonstrated. This open-labelled, randomised, controlled, crossover trial was designed to explore the effects of virgin coconut oil on plasma lipoproteins levels. The study involved 32 healthy Thai volunteers aged 20 – 23 years. After baseline measurements, 32 participants (16 males and 16 females) were randomised to take either 15 ml virgin coconut oil or 2% carboxymethylcellulose solution (as placebo) twice daily for 8 weeks. After 8-week washout period, the participants crossed over to take the opposite regimen for 8 further weeks. Every participant were requested to daily record all food, food supplement, medicines they took including their daily activities and any presented adverse effects throughout the study. In comparison with taking 2% carboxymethylcellulose solution, taking virgin coconut oil 15 ml twice daily was associated with a significant increase in HDL-cholesterol level by 5.72 mg/dl (95% CI: 2.44 – 9.00). The changes in total cholesterol, LDL-cholesterol and triglyceride levels were not significantly different between the two regimens. There were no significant changes in blood pressure, body weight and in renal and hepatic functions, according to serum creatinine, blood urea nitrogen, aspartate transaminase, alanine transaminase and alkaline phosphatase levels. Some participants had reported mild diarrhoea, especially during the first week of taking coconut oil or taking with an empty stomach. The study demonstrated that dietary supplementation with virgin coconut oil 30 ml daily in young healthy adults increased HDL-cholesterol without any significant harm.

Keywords: virgin coconut oil, lipid profiles, plasma liproprotein, HDL-cholesterol, total cholesterol, LDL-cholesterol, triglyceride

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Background

Saturated fats have been considered as a major cause of developing cardiovascular disease (CVD). For a couple decades, the consumption of coconut products in Thailand have declined since everybody knows that there are lots of saturated fat in coconuts and their extract (milk and oil). However, the prevalence of CVD in Thai population has increased in the opposite direction. Moreover, there are no studies showing that consumption of coconuts oil cause CVD. Up until the recent years, the coconut oil's consumption has been raised dramatically. Coconut oil has been claimed to be the healthiest oil on earth. Many sources, especially on internet and magazine, claim that virgin coconut oil can prevent or reduce the risk of heart diseases, diabetes, liver disease, and can lower cholesterol level. Unfortunately, studies on the benefits of coconut oil on those diseases have not been published in a scientific journal. There are a few studies that demonstrated the benefit of virgin coconut oil on plasma lipid profiles. However, no study has ever done in Thai population.

Objective

1. To investigate the effects of daily consumption of virgin coconut oil on plasma lipoproteins levels
2. To investigate the adverse effects of daily consumption of virgin coconut oil

Methodology

Research design
- Open-labelled, randomised, controlled, crossover trial

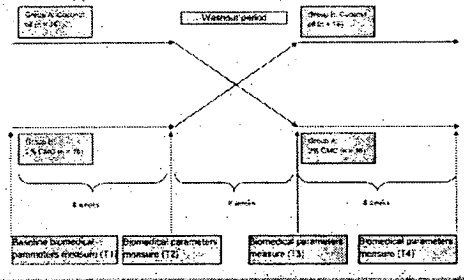
Ethic committee approval and informed consent
- The study was approved form the ethic committee, Faculty of Pharmacy, Chiang Mai University and all participants signed informed consent documents prior to entering the study.

Participants
- Thirty-two healthy female and male (16 each) Thai volunteers aged 18 – 25 years

Study profile (Figure1)
- Measure baseline relevant biomedical parameters (i.e., lipid profile (total cholesterol, LDL-C, HDL-C, triglyceride), liver function (AST, ALT, Alkaline phosphatase) and renal function tests (BUN, serum creatinine) ; T1
- The participants were randomly allocated to take either 15 ml virgin coconut oil or 2% carboxymethylcellulose (CMC) solution (as placebo), 16 in each group, twice daily for 8 weeks.
- Measure relevant biomedical parameters; T2
- 8-week washout period
- Measure relevant biomedical parameters; T3
- The participants crossed over to take the opposite regimen for 8 further weeks
- Measure relevant biomedical parameters; T4
- Every participant were requested to daily record all food, food supplement, medicines they took including their daily activities and any presented adverse effects throughout the study

Statistic analysis
- Student paired t-test

Figure 1: The study profile



Results

The study found that taking virgin coconut oil 15ml twice daily for 8 weeks significantly increased HDL-C level while taking 2% carboxymethylcellulose solution 15ml twice daily reduced total cholesterol and LDL-C levels significantly (Table 1). In comparison with taking 2% carboxymethylcellulose solution, taking virgin coconut oil 15 ml twice daily was associated with a significant increase in HDL-C level by 5.72 mg/dl 95% CI (p=0.001, : 2.44 – 9.00). Table 2 and Figure 2. The changes in total cholesterol, LDL-cholesterol and triglyceride levels were not significantly different between the two regimens (Table 2). There were no significant changes in blood pressure, body weight, renal and hepatic functions (Table 2). Although the change in alanine aminotransferase level was statistically significantly higher when taking coconut oil, compared to taking 2% carboxymethylcellulose, this change seemed not to be clinically significant. Half of participants reported mild diarrhea and some reported mild stomachache, nausea and vomit, especially at the first week of taking coconut oil or taking with an empty stomach (Table 3).

Table 1: The results of biomedical parameters of 32 participants, before and after consumption of 15 ml of virgin coconut oil or 2% carboxymethylcellulose twice daily for 8 weeks

	Biomedical Parameters (Mean)					
	Virgin coconut oil			2%carboxymethylcelloloso		
	Before	After	p-value*	Before	After	p-value*
Weight (kg)	58.9	59.2	*0.365*	59.1	58.7	*0.430*
BMI (kg/m^2)	20.8	20.9	*0.495*	20.9	20.7	*0.403*
SBP (mmHg)	114.3	114.8	*0.762*	115.6	117.6	*0.187*
DBP (mmHg)	71.2	70.4	*0.535*	71.3	69.5	*0.430*
Blood urea nitrogen (mg/dl)	12.3	12.1	*0.835*	12.0	11.2	*0.066*
Serum creatinine (mg/dl)	0.80	0.81	*0.231*	0.79	0.82	*0.057*
Total cholesterol (mg/dl)	190.4	187.7	*0.389*	191.1	183.7	*0.021*
Triglyceride (mg/dl)	67.8	64.7	*0.477*	69.3	72.3	*0.493*
HDL – cholesterol (mg/dl)	60.3	64.2	*0.001*	60.8	59.0	*0.124*
LDL – cholesterol (mg/dl)	116.6	110.5	*0.061*	116.4	110.2	*0.036*
Aspartate Aminotransferase - AST (U/L)	19.1	19.5	*0.699*	20.8	18.8	*0.247*
Alanine aminotransferase - ALT (U/L)	15.0	17.2	*0.105*	15.2	14.4	*0.517*
Alkaline phosphatase (U/L)	71.7	71.2	*0.683*	68.9	69.4	*0.807*

* Student paired t-test

Figure 2: Changes in HDL-C levels before and after consumption of 15 ml of virgin coconut oil or 2% carboxymethylcellulose twice daily for 8 weeks

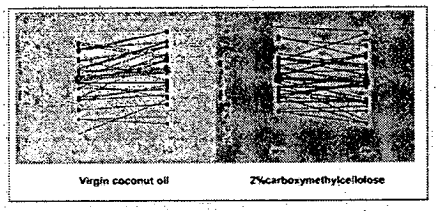


Table 2: Differences in the changes of biomedical parameter between before and after consumption of 15 ml of virgin coconut oil or 2% carboxymethylcellulose twice daily for 8 weeks (n=32)

	Biomedical Parameters (Mean ± SD)			
	Change		Difference in change	p-value*
	Virgin coconut oil	2%carboxy-methylcellulose		
Weight (kg)	0.31 ± 1.92	-0.38 ± 2.65	0.72 ± 4.35	0.387
BMI (kg/m^2)	0.08 ± 0.64	-0.15 ± 0.98	0.23 ± 1.45	0.278
SBP (mmHg)	0.50 ± 9.28	1.81 ± 7.61	-1.31 ± 10.52	0.485
DBP (mmHg)	-0.78 ± 9.24	-1.78 ± 12.60	1.00 ± 16.91	0.740
Blood urea nitrogen (mg/dl)	-0.13 ± 3.36	-0.84 ± 2.59	0.72 ± 4.35	0.357
Serum creatinine (mg/dl)	0.02 ± 0.07	0.03 ± 0.09	-0.02 ± 0.10	0.393
Total cholesterol (mg/dl)	2.75 ± 18.00	-7.41 ± 17.26	4.63 ± 24.91	0.302
Triglyceride (mg/dl)	3.66 ± 24.07	3.00 ± 25.00	0.13 ± 32.70	0.298
HDL – cholesterol (mg/dl)	3.91 ± 6.34	-1.81 ± 6.49	5.72 ± 9.01	*0.001*
LDL – cholesterol (mg/dl)	-6.08 ± 17.65	-6.21 ± 16.04	0.13 ± 21.16	0.972
Aspartate Aminotransferase - AST (U/L)	0.38 ± 5.44	-2.09 ± 9.60	2.38 ± 10.60	0.223
Alanine aminotransferase - ALT (U/L)	2.16 ± 7.30	-0.81 ± 7.02	2.97 ± 7.86	*0.041*
Alkaline phosphatase (U/L)	-0.47 ± 6.43	0.44 ± 10.04	-0.91 ± 7.86	0.705

* Student paired t-test

Table 3: Self reported adverse events from consumption of 15 ml of virgin coconut oil or 2% carboxymethylcellulose twice daily for 8 weeks (n=32)

Events	Number of participants with events (%)*	
	Virgin coconut oil	2% carboxymethylcellulose
Diarrhea (mild)	18 (56.3)	0
Diarrhea (moderate - severe)	5 (15.6)	0
Stomachache (mild)	7 (21.9)	1 (3.1)
Nausea (mild)	7 (21.9)	0
Vomit (mild)	1 (3.1)	0

* One participant may have more than one event.

Discussion and conclusion

The study demonstrated that dietary supplementation with virgin coconut oil 30 ml daily in young healthy adults increased HDL-C level without any significant harm. The results of this study were consistent with the results from previous studies in which taking virgin coconut oil increased HDL-C level while having little effects on total, LDL-C and triglyceride levels[1-4].

Acknowledgement

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