

**Relationship between coconut oil intake and serum lipid and ApoA-1 profiles among the traditional coconut oil consumers in Ciamis Regency, West Java, Indonesia: The possible protective role of lauric acid though gene expression**

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Coconut oil is a saturated vegetable oil. It is traditionally thought to be associated with the increased levels of total serum cholesterol, LDL cholesterol, and increased risks of cardio-vascular diseases (Shekelle *et al.*, 1981). A study has been initiated not only to disprove this theory, but also to find evidence that coconut oil promotes normal lipid profile and is able to protect us against cardio-vascular diseases.

Although coconut oil is high in saturated fatty acids (91% of total fat), but 69.2% of SAFA are MCFA (or 63% of total fat) (Muller *et al.*, 2003). MCFA are easily metabolized and do not increase total cholesterol and LDL cholesterol (Gurr, 2000). Among the MCFA, lauric acid comprises of 48 g per 100 gram coconut oil (Muller *et al.*, 2003). Adequate intake of coconut oil is healthy, and should be associated with normal lipid profile and normal health.

A cross sectional study was carried out among traditional coconut farmers who are also traditional coconut oil consumers in Ciamis Regency, West Java, Indonesia. Forty six healthy subjects were recruited for the study, consisting of 22 males and 24 females with average age of  $39.1 \pm 10.4$  years. Daily fat intake was  $47.9 \pm 27.27$  g with coconut fat intake of 28.8 g (60% of total fat intake). Laboratory data showed that the average levels of total serum cholesterol, LDL cholesterol, HDL cholesterol, triglyceride, ApoA-1A and LDL/HDL ratio were  $184.9 \pm 38.41$  mg/dl,  $115.5 \pm 36.88$  mg/dl,  $54.7 \pm 11.44$  mg/dl,  $136.5 \pm 17.12$  mg/dl and  $2.23 \pm 0.71$  respectively. All farmers appeared to be physically healthy, with normal total serum cholesterol (<200 mg/dl) - 71.7%, normal LDL cholesterol (< 130 mg/dl) - 69.6%, normal HDL cholesterol (> 40 mg/dl)- 93.5%, normal ApoA-1 - 95.7%, normal triglyceride (<150 mg/dl) - 87% and 100% with low risk of CHD (based on LDL/HDL ratio <4). The data suggest that coconut oil may have a protection effect against abnormal lipid profile.

The positive effect of coconut oil intake is also shown by the study in Muller *et al.* (2003) in Norwegia, in which, replacing PUFA with coconut oil SAFA for 22 days improved lipid profile as shown by the increase of serum cholesterol-HDL and ApoA-1 levels (Gupta and Rolandelli, 2005).

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Coconut oil MCFA (especially lauric acid) may have a major role in gene expression. The latest evidence is shown by the finding of the human CYP4A1 gene by Cho et al. (2005) in Korea. This gene is stimulated by lauric acid and is involved in the balance production of lipids in the human liver, resulting in the protection against unwanted abnormal lipid profile (Cho et al., 2005). However, based on the results of this study, protective effects of lauric acid can only be achieved if coconut oil intake is around 28.8 g (or 29 g) per day.

**Key words:** Coconut oil, age, BMI, total cholesterol, LDL cholesterol, HDL cholesterol, triglyceride, ApoA-1, LDL/HDL ratio, gene expression, lauric acid, human CYP4A11 gene.

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