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Virgin Coconut Oil for HIV - Positive People

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Abstract

The objective of the study was to determine effects of 3 x 15 ml/day Virgin Coconut Oil supplementation for 6 weeks in subject to $CD4^+$ T lymphocyte concentration and conducted at Special health center on Dharmais Cancer Hospital, Jakarta. The methods involved experimental study with parallel design on 40 HIV subject with $CD4^+$ T lymphocyte count > 200 cell/µL divided into two groups, VCO group, subject in this group received VCO supplementation 3 x 15 ml/day for 6 weeks and non-VCO Group (without VCO supplementation). Data collected includes demographic characteristic (age and sex), anthropometric (weight, height, and body mass index), daily intakes by food recall 1 x 24 hours and laboratory ($CD4^+$ T lymphocyte count). Statistical analysis was performed with independent t test and Mann-Whitney U test. The results could be summarised as follows. The average BMI were 20.8 ± 2.29 kgs/sqm (VCO group) and 20.7 ± 3.38 kgs/sqm (non-VCO group). Energy and fat intake between VCO group (1459 ± 327.4 Cal/day and 81.8 ± 19.35 gs/day) and non-VCO group (1101 ± 319.8 Cal/day and 37.1 ± 19.35 gs/day). Carbohydrate and protein intake between VCO group (143.8 ± 44.58 gs/day and 41.6 ± 14.04 gs/day) and non-VCO group (151.6 ± 14.04 gs/day and 39.5 ± 18.31gs/day). There were significant differences (p = 0.047) in average of $CD4^+$ T lymphocyte count after 6 weeks intervention between VCO group (481 ± 210.0 cell/µL) and non-VCO group (343 ± 129.1 cell/µL). The conclusion is that Virgin Coconut Oil supplementation 3 x 15 ml/day for 6 weeks increases $CD4^+$ T lymphocyte concentration in HIV patient.

Keywords: *Virgin Coconut Oil***,** $CD4^+$ T lymphocyte, Energy intake, and HIV

Introduction

HIV/AIDS is a global crisis, affecting many aspects of life. Social stigma and the economic cost of HIV/AIDS have been haunting many patients, societies and governments. The cost of treatment and prevention measures has been a serious burden not only for developing countries, but industrialized ones as well (Walker, 2003). Since the first report of HIV infection in 1981, more than 40 million people have been infected and more than 20 million of which have died from AIDS (UNAIDS, 2004).

Prevalence of AIDS varies among countries. The highest reported is the Sub Sahara region of Africa, which have a 30% rate of infection. It is estimated, with the advancement in early diagnosis, that the numbers of HIV/AIDS patients will rise significantly (Kamps and Hoffmann, 2005). In Indonesia, the first case of AIDS was reported on a foreign tourist in Bali in 1987. HIV/AIDS have now spread to all the provinces of Indonesia. No certain data exist on how many people suffer from the disease, but experts estimate about 80,000 to 120,000 Indonesian live with HIV (Sujudi, 2002).

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HIV mainly destroys the immune system, causing decreased quantity and quality of lymphocyte T cells, especially CD4. Progressives of the disease will depend mainly on the host immune response, which is measure by the amount of CD4 in the body (CD4 count). Therefore, CD4 count is the base of HIV infection classification (Kamps and Hoffmann, 2005). Nutrition is well known for its immune response stimulation effects. Malnutrition can aggravate the disease by up regulating viral replication (Scrimshaw and San Giovanni, 1997). On the other hand, achievement of optimal nutritional intake will ensure adequate immune response of HIV patients (Kotler, 1992).

Coconut oil has long been used not only as food, but also as traditional remedies. Indigenous population of the Asia Pacific, which consumes coconut and coconut oil has long been known to have healthy and long lives. Despite the many benefits, many publications have focused on the negative effects of coconut oil. Their focus is on the high content of saturated fatty acids (SAFA). Saturated fatty acid is believed to be the main cause of arterial coronary diseases. This belief has caused people to turn to other sources of plant oil, which sure low in SAFA, in their daily food consumption. This notorious belief is not entirely true, because SAFA in coconut oil, consist mainly of medium chain triglyceride/MCT, which have many beneficial health effects.

Coconut oil has unique features, where it is not only a source medium chain fatty acids, which are easier to absorb and utilize by cells, it also contain lauric acid and capric acid, which have anti microbial effects (Odle, 1997; Klein et al, 1999). These substances can destroy bacteria and virus which have lipid layer on their cell membrane (Enig, 1998). Because of its fatty acids and other nutrient contents, coconut oil is thought to be beneficial to HIV patients.

Methods

This trial was an experimental study conducted at Dharmais Cancer Hospital Special Clinic, Jakarta for six weeks (between June until August 2006). Written informed consent was obtained from subjects or legal guardians. Age between 18 – 59 years, HIV positive with CD4+ count > 200 cell/µL and without antiretroviral (ARV) treatment were considered as inclusion criteria for this study. Exclusion criteria included chronic protein energy malnutrition (body mass index < 17 kg/sqm), history of cardiovascular disease and diabetes mellitus (from anamnesis), pregnant and breast feeding. Subject removed from the study if subject death, refused to continue the trial and difficulty to follow protocol.

Forty subjects who met inclusion criteria were admitted to this study. The subjects were selected using block-randomized method into two groups designated as VCO and non-VCO, 20 subjects in each group. The main different treatment was on the VCO group, all the subjects received VCO 3 x 15 ml/day for six weeks but not in the non-VCO group.

Population demographics data (age and sex), anthropometric measurements included height and weight to determine body mass index (BMI), assessment of nutritional intake with food recall 1 x 24 hours was used to establish daily energy and macronutrient intake and laboratory assessment ($CD4^+$ count) will be done on subjects. Statistical Analysis used independent t test for group difference if normal distribution otherwise the Mann-Whitney test.

Results

In the VCO group, 57% subjects were between 18 – 29 years old and in the non-VCO group 71% subject were between 18 – 29 years old. Women were the greatest number in the VCO group (71%); on the contrary man was the most number in the non-VCO group (64%). 12 subjects (6 from each group) had dropped out from the study. Eight subjects had dropped out because they had difficulty to follow up (loss of contact), 3 subjects have moved outside Jakarta and 1 subject was tag on other trial. 92% subjects had HIV from intravenous drug use (IDU), 5% from heterosexual intercourse, and 2% from homosexual intercourse. There was no significant difference on anthropometric measurement before and after treatment (Table 1).

Table 1. Weight, height, and body mass index

Variable	VCO (n=14)	Non-VCO (n=14)	*p*
Weight (kg)			
Before treatment	53.7 ± 7.78	56.0 ± 7.96	0.291[m]
After treatment	54.0 ± 7.46	55.8 ± 7.64	0.358[m]
Height (m)			
Before treatment	160.5 ± 7.03	164.6 ± 4.83	0.082[t]
After treatment	160.5 ± 7.12	164.6 ± 4.83	0.09[t]
Body mass index (kg/sqm)			
Before treatment	20.8 ± 2.29	20.7 ± 3.38	0.55[m]
After treatment	20.9 ± 2.06	20.7 ± 3.21	0.811[t]

m = Mann-Whitney U
t = independent t test

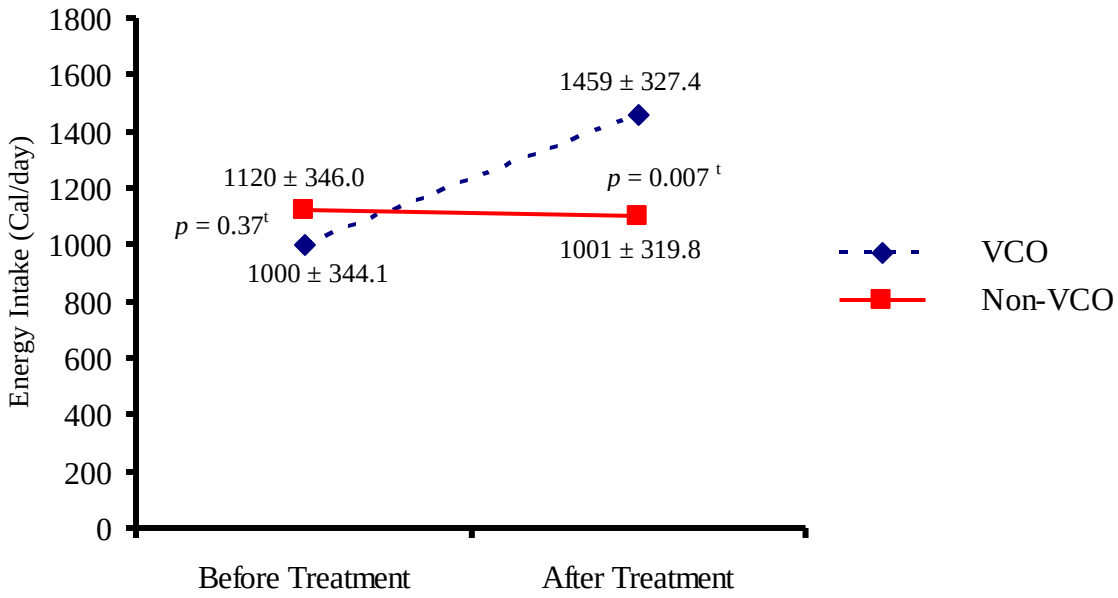

Figure 1. Energy intake before and after treatment between VCO and non-VCO

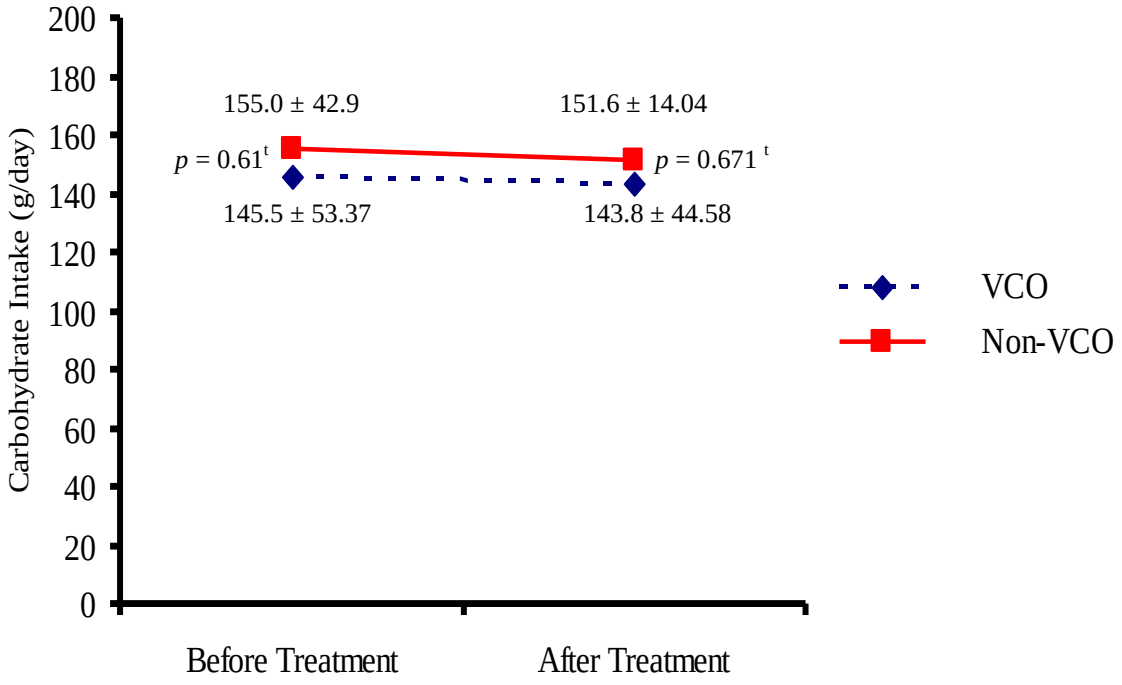

Figure 2. Carbohydrate intake before and after treatment between VCO and non-VCO

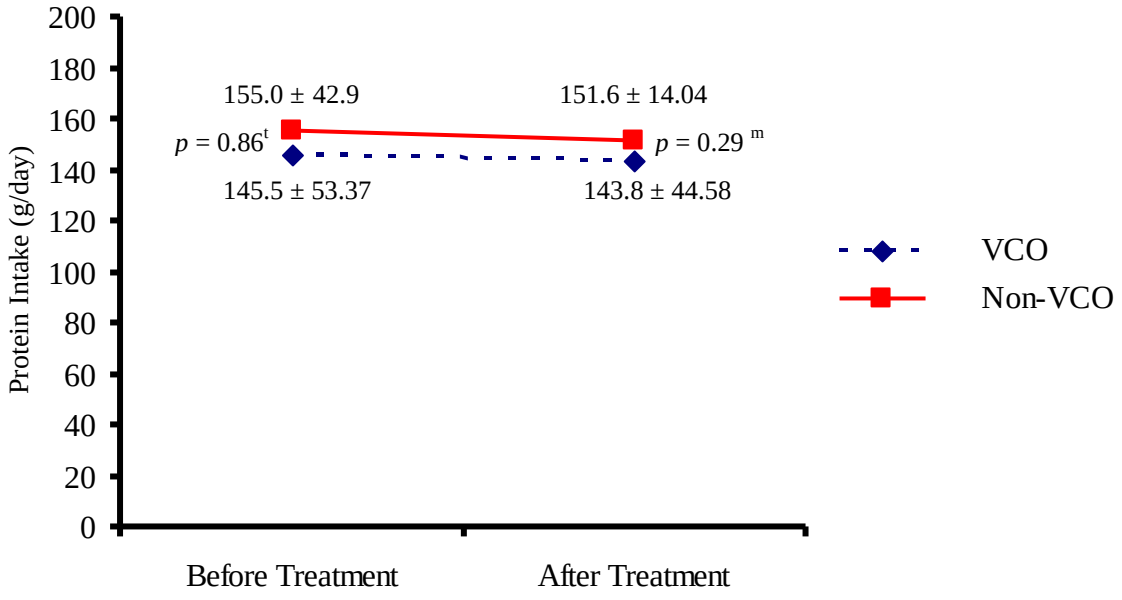

Figure 3. Protein intake before and after treatment between VCO and non-VCO

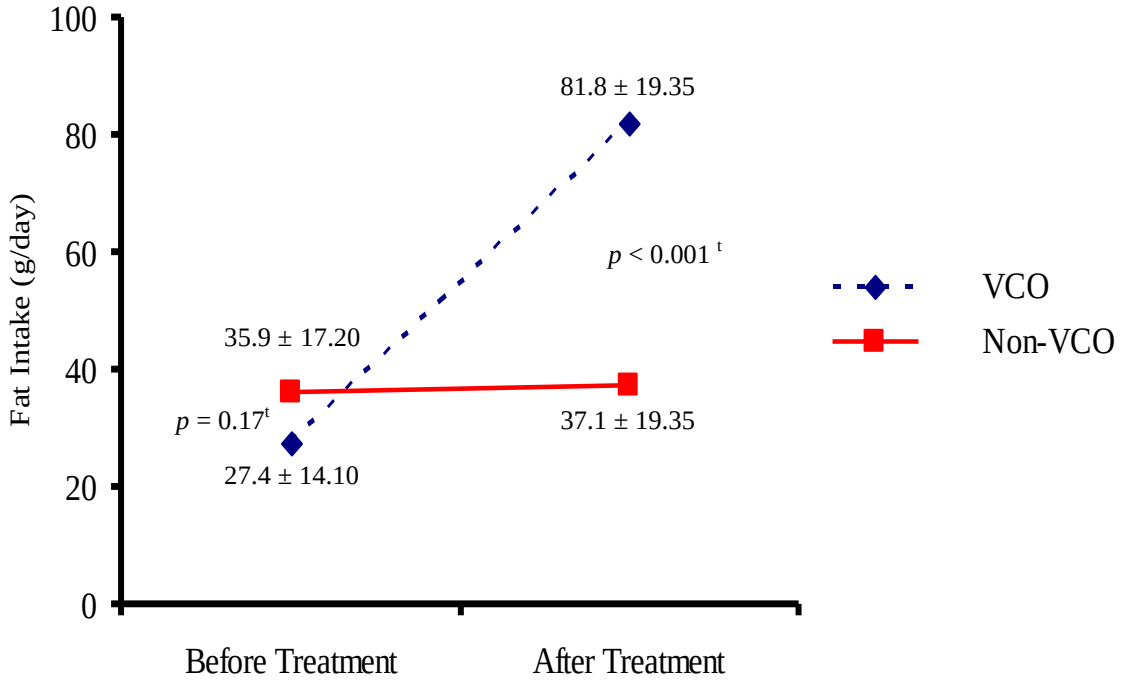

Figure 4. Fat intake before and after treatment between VCO and non-VCO

Table 2. Energy requirement, energy intake, and energy intake proportion

Energy	**VCO**	**Non VCO**	***p***
Requirement (Cal/day)	2608.57 ± 309.41	2820.71 ± 321.74	0.084[m]
Intake (Cal/day)	1459.35 ± 327.37	1101.01 ± 319.82	0.007[t]
Energy Intake Proportion (%)	56.07 ± 11.7	39.43 ± 13.03	0.004[m]

m = Mann-Whitney U test
t = Independent t test
Significant at $p < 0.05$

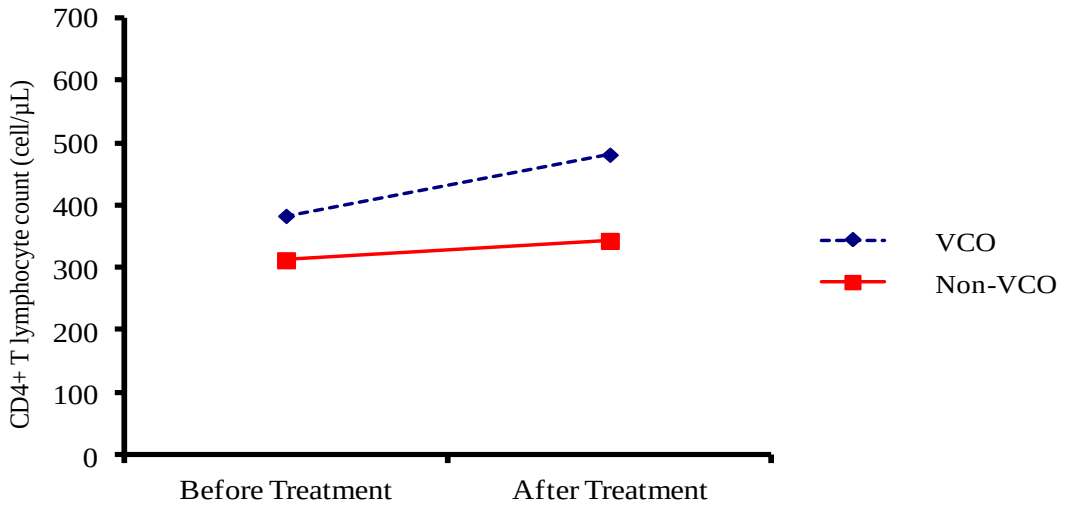

Figure 5. CD4$^+$ T lymphocyte count before and after treatment between VCO and non-VCO

Nutritional assessment

There was no significant difference on energy intake before treatment (p = 0.37) on the contrary, there was significant difference on energy intake after treatment (p = 0.007) between VCO and non-VCO (figure 1). There were no significant difference on carbohydrate (figure 2) and protein intake (figure 3) not only before treatment but also after treatment. There was significant difference on fat intake after treatment (p < 0.001) between VCO and non-VCO (figure 4).

Energy Intake Proportion

There was no significant difference on energy requirement (p = 0.084) between VCO and non-VCO. However there was significant difference on energy intake proportion (energy intake per energy requirement) (p = 0.004) between VCO and non-VCO (table 2).

CD4$^+$ T Lymphocyte Count

There was no significant difference on CD4$^+$ T lymphocyte count (p = 0.37) before treatment between VCO and non-VCO. However there was significant difference on CD4$^+$ T lymphocyte count (p = 0.047) after treatment (figure 5).

Discussion

30% subjects drop out in this study resulted declining on research power from 80% to 60 – 70%. High number of drop out in this study resulted from most of the subject (92%) in this study were drug or narcotic user (junkies). We know that junkies have high incline to use drug/narcotics again because of emotional factor or peer pressure. This condition made difficult to obtain subject to follow the protocol.

92% subject had HIV from IDU. In developing country, HIV spread mostly through IDU (WHO, 2005). Badan Narkotika Nasional (BNN), 2004 conducted a study in ten big cities in Indonesia (Medan, Jakarta, Bandung, Semarang, Yogyakarta, Surabaya, Makasar, Denpasar, Manado and Batam) found that 56% from 572 thousand people are intravenous drug/narcotic user and 40% or 229 thousand are HIV positive. This different data show to us that HIV cases rise very high in past four year.

Body mass index is not significantly different between VCO and non-VCO not only before treatment but also after treatment. Short period of treatment and not lower proportion of energy intake were main reason from that result. There was interesting data from this study,

although all the subject had lower energy intake proportion but all of them had normal BMI. There are several explanation. First, possible occurred inaccuracy or bias in food recall interview. Second, reference for energy requirement from AKG (Angka Kebutuhan Gizi) or Indonesian RDA is not suitable for the subject (too high). There were several study had the same result using AKG for energy requirement reference (Muhilal et all, 1998; Hatma, 2001; dan Nugraha, 2005). If we calculated basal energy requirement with Harris-Benedict equation, the entire subject had 75% (minimum) fulfilled basal energy requirement. But there is no data to show us that how long if someone had energy intake only for basal requirement have affected BMI. McCallan et all, 1985 show that BMI will decline if there is opportunistic infection on HIV subject.

$CD4^+$ T lymphocyte count is used to indicate HIV disease progression, because HIV bind to this receptor in human body resulted destruction and decline of $CD4^+$ T lymphocyte count. In this study show that there was significant difference on $CD4^+$ T lymphocyte count between VCO and non-VCO. This result indicates that VCO supplementation had positive influence to $CD4^+$ T lymphocyte. The same result was obtained by Dayrit (2000). One of the reason of positive influence VCO supplementation on $CD4^+$ T lymphocyte is high content of lauric and capric acid in VCO. As we know that lauric and capric acid are fatty acid with antiviral and bacterial capability. Takatsuki et all (1969) showed that fatty acid had toxic on viral cultivated and the more carbon chain on fatty acid made the more weaker toxicity characteristic. Thormar et all (1987) showed that lauric and capric have the antiviral ability, it can destruct lipid capsule layer virus at ten times more on lower concentration compare to long chain fatty acid like oleat and linoleat

It can be concluded that Virgin Coconut Oil supplementation 3 x 15 ml/day for 6 weeks significantly increases CD4+ T Lymphocyte concentration in HIV patient.

References

Badan Narkotika Nasional (2004) Biaya ekonomi dan sosial penyalahgunaan narkoba di Indonesia tahun 2004. *Research Report*. Jakarta

Dayrit C.S. (2000) Coconut oil in health and disease: its and monolaurin's potential as cure for HIV/AIDS. XXXVII Cocotech Meeting. Chennai, India. http://www.coconutresearchcenter.com. Access on 28th December 2006.

Enig M.G. (1998) Lauric oils as antimicrobial agents: theory of effect, scientific rationale, and dietary application as adjunct nutritional support for HIV-infected individuals, in *Nutrients and Foods in AIDS* (editor Watson R.R.). Page 81 – 97. CRC Press, Florida.

Hatma R.D. (2001) Nutrient intake and their relation to lipid profile in diverse ethnic population, *Dissertation*. Post Graduate Program, University of Indonesia, Jakarta.

Kamps B.S. and Hoffmann C. (2005) Introduction, in *HIV Medicine 2005* (editor Hoffmann C., Rockstroh J.K., and Kamps B.S.). Page 23 – 32. Flying Publisher, Paris.

Klein S., Cohn S.M., and Alpers D.H. (1999) The alimentary tract in nutrition: a tutorial, in *Modern Nutrition in Health and Disease* (editor Shils M.E., Olson J.A., Shike M., and Ross C.A.). 9th Ed, page 605 – 629. William & Wilkin, Pennsylvania.

Kotler D.P. (1992) Nutritional effects and support in the patient with acquired immunodeficiency syndrome. *J. Nutr*. 122 (Suppl. 3), 723 - 727.

Macallan D.C., Noble C., Baldwin C., Jebb S.A., Prentice A.M., and Coward W.A. (1995) Energy expenditure and wasting in human immunodeficiency virus infection. *N.Engl.J.Med*. 333(2): 83 – 88.

Muhilal, Jalal. F., and Hardinsyah (1998) Angka kecukupan gizi yang dianjurkan. dalam Prosiding Widyakarya Nasional Pangan

dan Gizi VI Serpong 17-20 Februari 1998. (editor Winarno F.G., Tsauri S., Soekirman, Sastrapradja D.S., Wirakartakusumah M.A., Rifai M.A., Jalal F., Suryana A., Husaini M.A., Atmowidjojo M., and Koswara S.) page 843-879. Lembaga Ilmu Pengetahuan Indonesia. Jakarta.

Nugraha G.I. (2005) Profil lipid dan apolipoprotein A-I serta faktor-faktor yang berhubungan pada perajin minyak kelapa di Jawa Barat. *Thesis*.

Odle J. (1997) New insights into the utilization of medium-chain triglycerides by the neonate: observations from a piglet model. *J. Nutr*. 127, 1061 – 1067.

UNAIDS (2004) Report on the global AIDS epidemic: executive summary. http://www.unaids.org. Access on 2nd January 2006.

Scrimshaw N. and SanGiovanni J.P. (1997) Synergism of nutrition, infection, and immunity: an overview. *AJCN* 66(2), 464-477.

Sujudi A. (2002) Penanggulangan HIV/AIDS di Indonesia respon saat ini-menangkal ancaman bencana nasional AIDS mendatang. Disampaikan dalam *Sidang Kabinet Sesi Khusus HIV/AIDS*. Jakarta.

Walker D. (2003) Cost and cost-effectiveness of HIV/AIDS prevention strategies in developing countries: is there an evidence base? *Health Policy Planning* 18(1), 4 – 17.

Takatsuki A., Tamura G., and Arima K. (1969) Antiviral and antitumor antibiotics. Effects of ascochlorin and other respiration inhibitors on multiplication of newcastle disease virus in cultured cells. *Applied Microbiology* 17(6), 825 – 829.

Thormar H., Isaacs C.E., Brown H.R., Baarshatzky M.R., and Pessolano T. (1987) Inactivation of enveloped viruses and killing of cells by fatty acids and monoglycerides. *Antimicrob. Agents Chemother*. 33(1), 27 – 31.