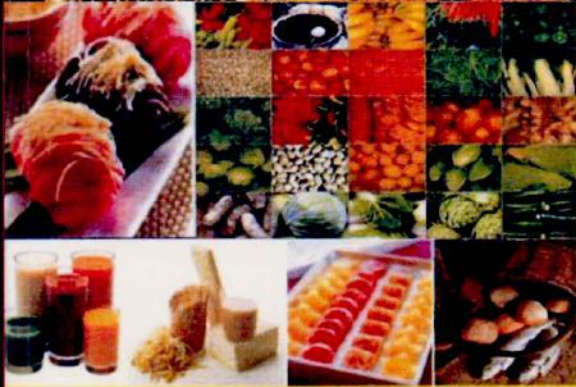


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PROCEEDING

International Food Conference 2011
"Life Improvement through Food Technology"
Surabaya, October 28th - 29th, 2011



Editors

Prof. Dr. Ir. Endang S. Rahayu

Prof. Dr. Ir. Yustinus Marsono

Dr. Ir. A. Ingani Widjajaseputra, MS

M. Indah Epriliati, PhD

Dr. Ihab Tewfik

Auditorium Benedictus

Widya Mandala Catholic University Surabaya

Supported by



World Association for
Sustainable Development



International Forum
For Public Health



Indonesian Association
Food Technologist

Organized by



Agricultural Technology Faculty
Widya Mandala Catholic University
Surabaya

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INTRODUCTION

Healthy and high quality, acceptable foods will improve the quality of life in general, but they need the appropriate technology to produce. The development of food technology allows the growth of not only large-scale food industries but also home industries. It will give positive impacts to the welfare of society. That is why the conference focused on the theme of Life Improvement through Food Technology.

The development of food technology and its application can't be separated from the role of various parties such as researchers, academicians, industrialists, and the government as policy makers. At the 25th anniversary of Food Technology Department of Agricultural Technology Faculty-Widya Mandala Surabaya Catholic University organized The International Food Conference to bring all parties together in order to contribute to the life improvement internationally through the dissemination and discussion of research results and their application for human health and well-being. In general, the problems was classified in to four groups: development of food processing and engineering; availability of health and safe food, and functional food that support human health; and effectiveness of food marketing and management; so the technical session was clustered based on those subject.

Various speakers from inside and outside of the country those have expertise in food technology field which related to life improvement presented as keynote speakers. It is expected the conference will be able to strengthen the networking among the international and national partners and all industry partners to improve the quality of life. Hopefully the conference is meaningful for all parties involved.

ABOUT THE ORGANIZERS

Widya Mandala Catholic University Surabaya (WMCUS)

Widya Mandala Catholic University Surabaya (WMCUS) was founded in 1960. Throughout its history, WMCUS has offered undergraduate and graduate educations characterized by academic excellence. Responding to the strong social demands for experts in the field of art, science, and technology, the university is committed to provide its students with qualified and dedicated teaching staffs and excellent educational supporting facilities. WMCUS has 10 faculties, consists of 14 study programs i.e. Pharmacy, Physic Education, English Education, Management, Accounting, Electrical Engineering, Chemical Engineering, Industrial Engineering, Food Technology, Psychology, Nursing, Philosophy, Communication Science and Medicine. Its students are guided according to its motto "**NON SCHOLAE SED VITAE DISCIMUS**", meaning "*we study not for science per se but more importantly for the humane*". For further information please visit www.wima.ac.id.

Department of Food Technology, Faculty of Agricultural Technology

Department of Food Technology has promising prospects in the fields of: development and innovation in food production, its processing and its distribution strategy; establishing and managing a business in food production; and pursuing a career in research, consulting service, and food processing instruments. This department has several collaborative network, i.e.: Department of Industry and Commerce of East Java, The National Agency of Drug and Food Control, (BPOM, Indonesia); Union of Indonesian Food and Beverage Manufacture (GAPPMI), Association of Indonesian Catholic Higher Learning (APTIK), Food Processing Industries and Plants/Factories, and also Prestigious Universities in Indonesia.

Greeting from

**Dean of Faculty Agricultural Technology
Widya Mandala Catholic University Surabaya**

Ladies and gentlemen,

I would like to warmly welcome you in Surabaya. Thank you for your attendance to the opening of the International Food Conference with the theme "Life Improvement through food Technology" which is organized by the Faculty of Agricultural Technology of Widya Mandala Catholic University Surabaya.

This International Food Conference mark the 25th anniversary of Agricultural Technology Faculty. In this moment, Food Technology Studies Program would like to act more for the wider community. Therefore, one of the selected activities that can be held is the International Food Conference. By sharing information and discussion with other academicians, researchers, food industrialists and the goverment through this forum, I hope all of us can improve the lhuman life according to the chosen theme in this conference.

On this occasion, I would like to thank the generous support of several institution, especially to the World Association for Sustainable Development (WASD), International Forum for Public Health (IFPH), Indonesian Association of Food Technologist (IAFT). Similarly thank to The Hague University as an associate of cooperation that has sent representatives as keynote speaker, and also thank to the other keynote speaker as personnally or represent their institutions because of their kindness and cooperation.

Finally, I sincerely thank to the University, all participating companies and all participants for the contributions to make this conference possible.

At last, I wish you an enjoyable during this conference.

Faculty of Agricultural Technology,
Dean,

Ir. Theresia Endang Widoeri Widyastuti, MP

WELCOME TO INTERNATIONAL FOOD CONFERENCE 2011
Chairperson Of Organizing Committee

At this moment we face many health issues due to the problems in food production. The problem may be the rarity of raw materials that require an exploration of new materials suitable to grow in respective countries or areas, or it may be the lack of ability to produce an acceptable and accessible healthy food. It may also be the need to manage the distribution system well and effective marketing to fulfill the consumer needs. By providing solutions to these problems and other problems, it is hoped that the life quality of the affected area will improve.

Of course, the problems faced in one part of the world are not the same from other parts of the world. That creates a need to hold an International Food Conference to: update on researches and issues on food technology related life improvement; sharing information on food processing and engineering, food safety, functional food and health, food marketing and management to meet consumer need. And Food Technology Department of Widya Mandala Surabaya Catholic University on the 25th anniversary organized The International Food Conference to bring all parties that consist of researchers, academicians, industrialists and government as policy makers in order to contribute to the life improvement internationally not only on human health but also general well being. We hope this International Food Conference can help strengthen the network among international and national researchers and industry partners to improve the quality of life. Therefore, the selection of the topic of the conference entitled "Life Improvement through Food Technology".

This International Food Conference is participated by 157 participants, that 47 of them are overseas participants from several countries: Australia, India, Iran, Malaysia, Nigeria, Pakistan, Singapore, Thailand; and also we have 4 overseas keynote speakers: Ihab Tewfik, PhD (Human and Health Sciences, University of Westminster, United Kingdom; International Forum for Public Health, United Kingdom); Prof Son Radu, PhD. (Food Science and Technology, Universiti Putera Malaysia, Malaysia); Phillippe J. Blanc, PhD. (Appliquees de Toulouse, Institut National des Science, France); and Johan M. Krop, PhD. (Process and Food Technology, The Hague University of Applied Science, Netherlands) and 3 Indonesian keynote speakers: Roy Sparringa, PhD (The National Agency of Drug and Food Control, BPOM, Indonesia); Dahrul Syah, PhD (Head of The Indonesian Association of Food Technologist); and Margaretha Indah Epriliati, PhD (Department of Food Technology, Faculty of Agricultural Technology, Widya Mandala Catholic University Surabaya). According to the participant list, the organizing committee has received 122 papers from participants: 47 papers of poster presentation, and 75 papers of oral presentation. The scientific meeting will be arranged in 3 plenary and 4 technical parallel sessions as well as a poster session during two days conference. Enhancing the networking strengthen among the participants would also be built from the social gathering since conference opening up to the conference dinner.

Ending this preface, on the behalf of the organizing committee I would like to express my gratitude to all keynote speakers; to Widya Mandala Surabaya Catholic University, Indonesian Association of Food Technologist (IAFT); International Forum for Public Health (IFPH); World Association for Sustainable Development (WASD); Food Review Indonesia; PT. Ditek Jaya; PT. Campina Ice Cream Industry; and PT. Biochem. The last but not least are distinguish speakers and participants for their tremendous effort and time spent in this

conference, without all of you the conference would not be held. I wish you the successful scientific meeting and hopefully come to further collaboration for future research activities.

For any shortcoming we may have during the holding of this event we would like to apologize in advance, but we hope that this Conference will be a successful and meaningful event for all parties involved. Thank you.

Organizing Committee,
Chairperson,

Indah Kuswardani, Ir. MP.

PROGRAM

SCHEDULE OF INTERNATIONAL FOOD CONFERENCE 2011

Friday, October 28th 2011

| Time | Activities | |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| 07.00-09.00 | Registration, Coffee Morning | |
| 09.00-09.30 | OPENING CEREMONY Indonesia Raya Anthem Welcome speech: Rector of UKWMS, Dean of Food Technology Faculty UKWMS, Chairperson of Organizing Committee | |
| 09.30-10.30 | FIRST PLENARY SESSION 1) Margaretha Indah Epriliati, PhD <i>(Department of Food Technology, Faculty of Agricultural Technology, Widya Mandala Surabaya Catholic University, Indonesia)</i> Speech topic: Constructing a Framework to Safeguard Food Technology for Betterment 2) Dr. Dahrul Syah <i>(The Indonesian Association of Food Technologists;)</i> Speech topic: Indonesian Food Technologist; Expected Role in Context of National Development | Moderator: Drs. Sutarjo Surjoseputro, MS |
| 10.30-11.30 | SECOND PLENARY SESSION 3) Ihab Tewfik, PhD <i>(Human and Health Science, School of Life Sciences, University of Westminster, United Kingdom; International Forum for Public Health, United Kingdom)</i> Speech topic: Modern Functional Meal: a Potential Answer to the Challenge of the Millenium Development Goals 4) Roy Sparringa, PhD <i>(The National Agency of Drug and Food Control, BPOM, Indonesia)</i> Speech topic: Current Food Safety Issues in Indonesia: Challenge & Expectation | Moderator: Prof. Y. Marsono, PhD |
| 11.30-11.45 | PT Ditek Jaya | |
| 11.45-12.30 | Lunch break + Pray | |
| 12.30-13.30 | Poster Session | |
| 13.30-17:00 | Paralel Session | |
| 17.00-18.30 | Evening Coffee and Expo (in Indonesian Traditional Atmosphere) | |

Saturday, October 29th 2011

| Time | Activities |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 07.00-08.00 | 2 nd day registration |
| 08.00-10.20 | Paralel Session |
| 10.20-10.45 | Coffee break |
| 10.45 – 11.00 | PT Campina Ice Cream Industry |
| 11.00-12.30 | <p>THIRD PLENARY SESSION</p> <p>1) Prof. Son Radu, PhD (Food Science and Technology, Universiti Putra Malaysia, Malaysia) Speech topic: Microbiological Risk Assessment as a Decision Support Tool: Reactive and Proactive Case Studies</p> <p>2) Phillipe J. Blanc, PhD (Institut National des Sciences Appliquees de Toulouse, France) Speech topic: Trends in food biotechnology - Natural Food Colorants: Biotechnology Aspect and Application in Food Industry</p> <p>3) Johan M. Krop, PhD (Process and Food Technology, The Hague University of Applied Sciences, Netherlands) Speech topic: Food Technology And Production In A Global Perspective</p> <p style="text-align: right;">Moderator: Prof. Endang S. Rahayu, PhD</p> |
| 12.30-12.45 | Best and Favourite Poster Announcement |
| 12.45-13.00 | Closing ceremony |
| 13.00-14.00 | Lunch |

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HEALTH EFFECTS OF NUTRAFOSIN BEVERAGE ON LIPID PROFILE OF PATIENT WITH DISLIPIDEMIA

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ABSTRACT

Inulin extracted from Dahlia pinnata root crop using 30 % etanol, and fructooligosaccharides (FOS) produced by sucrose fermentation by Aspergillus niger, were added in formulation of Nutrafosin beverage using wet homogenizing technique. One sachet (150 ml) of the Nutrafosin functional beverage formulated from 50 ml liquid FOS, 2 g inulin powder, 2 g Tropicana sweetener, and citric acid flavor, was consumed by dyslipidemia patient for 21 days. In a randomized single-blind placebo clinical controlled parallel study, control group consumed placebo beverage. Consumption data showed that average daily intakes of energy, macronutrients, and dietary fiber were as usual habit in both treatments. Food consumption data collected by interviewing using 24 hours recall and food frequency recall method showed that large amount of subject consumed carbohydrate and protein almost two and three times of its recommended, respectively. However, consumption of lipid was below the recommended (10-15 % total energy). Nutrafosin beverage contributed 1.06 - 1.42 % sucrose, 0.94-1.61 % fructose, 0.1- 0.39 %, glucose, 3.35 – 5.6 % reducing sugar, 56.64 – 88.54 % inulin, 2.84 – 3.87% soluble dietary fibre, 5.71-5.83 % pH, 69 % colour. The clinical trial test showed that consumption of Nutrafosin beverage for 21 days did not significantly increased TAG ($T_c = 0.57 < T_{tab} = 2,37$), and decreased cholesterol in HDL ($T_c = 0.29 < T_{tab} = 2,37$). Meanwhile , the consumption did not significantly decreased cholesterol total ($T_c = 0,51 < T_{tab} = 2,37$), and cholesterol in LDL ($T_h = 0,75 < T_{tab} = 2,37$), in dyslipidemia subject with imbalanced energy intake from carbohydrate, lipid, and protein.

Key word : *fructooligosaccharides, inulin, blood lipid profile, dyslipidemia subject, food consumption pattern, life style, nutrafosin beverage*

INTRODUCTION

Functional beverage is defined as beverage contained one or more food active compound that proven emerging scientifically health functional effect when consumed daily in certain intake. The health effect tested of functional beverage has to be done in certain experimental test stages, gradually, i.e chemical and biochemical study, animal study, and finally followed by clinical study on human. The proved chemical and biochemical characteristics of functional food compound at *in vitro* system must be continued to be tested on biochemically at *in vivo* system on animal study. The

potential health from animal study has to be confirmed in the human study. The health effect of new functional food, including health functional beverage have to be proved on human subject. The testing procedure in the human study should be approved by Ethic Commission of Health Study whom declare the approval in the ethical clearance document, and following by conducting *informed consent* activity for the human subject.

Based on scientific chemical and biochemical study at *in vitro*, *in vivo* system, and human study, Japan claimed for 12 groups of food compounds as functional food compounds, including

oligosaccharide such as fructooligosaccharide (FOS) and inulin (fruktan). Fructooligosaccharides that is also called neosugar, is formed by 3-10 molecules of fructose tied by β -2 \rightarrow 1 between its fructose molecules. These compound can be produced by *Aspergillus niger* with an assistance of enzyme β -fruktofuranosidase in sucrose fermentation into fructose molecules up to three fructose units (Toshiaki, 1995). Meanwhile, inulin that also called fruktan, is an oligomer of 30-140 FOS molecules. FOS and inulin can not be digested by enzymes ptyalin and amylase in humans, therefore it pass through the mouth, stomach, small intestine without metabolized. These compounds are totally metabolized in the colon through fermentation by colonic microflora (Rumessen et al., 1990), have fiber characteristic, and can be function as a prebiotic (Hoebergs, 1997). The energy produced from the fermentation process is largely in the form of the production of short chain fatty acids (acetate, propionate, and butyrate) and lactate, which when metabolized in the body equivalent to 1.5 kcal / g. Other products of fermentation are the mass and biogas which is excreted (Niness, 1999). In some studies they were able to increase the frequency of bowel, increase stool weight up to 2 grams per gram of inulin ingestion and fruktooligosakarida, and lower fecal pH (Gibson and Robertfroid, 1995; Menne et al., 1997). Decrease in faecal pH was brought to the suppressive effects of the substance putrefaktif production in the colon (Niness, 1999).

Several other health effect of FOS and inulin are decreasing of plasma triasilglicerol and blood cholesterol in hypercholesterolemia subject (Brighenti et al., 1995), and modification of macro nutrient absorption, especially carbohydrate, as such delaying of emptying gastric and reduce transit time of food in small intestine (Robertfroid, 2007). These two bioactive compounds

also decrease blood cholesterol (Hidaka et al., 1991), blood LDL, and triglicerides (TAG) (Causey et al., 2000). However, animal study done by Respondek et al (2008) proved that consumption of 10 g FOS for six days reduce insulin resistensi, and modulated gen transcription in glucose and lipid metabolism, although did not decrease fasting blood glucose level. Similarly, Alles et al study (1999) found that consumption of 20 g FOS did not decrease serum lipid and blood glucose in type-2 diabetes patient under medical control.

The possible mechanism of decreasing blood lipid profile and body weight caused by inulin and fructooligosaccharide is through modification of *Glucagon Like Peptide* (GLP-1). This entero endocrine involves in the regulation of eating appetite, i.e reduce eating appetite (Robertfroid, 2007). Inulin and FOS were proved in increasing GLP-1 level in colon and vena porta on rat (Delzene et al., 2005). Other possible factor of decreasing blood lipid profile is food consumption pattern. As discussing by Williams and Jackson (2002), the difference background of food consumption pattern, especially carbohydrate rich food consumption pattern, influences blood lipid profile. Other important aspect is the effect of functional food compound, including FOS and inulin, will emerge at subject with enough food consumption, or does not over consumption. Therefore, the imbalance of blood lipid profile is also stimulated by life style, and poor food consumption pattern.

The prolong abnormal blood lipid level has to be avoided since it could emerge advance negative effects, such as heart disturbance, especially heart attack and stroke. In as much, the effort of decreasing blood lipid profile through the supplement intake of food bioactive compound that able in modulation lipid metabolism becoming worthy to do. Besides, for

increasing and confirming the recent scientific research findings that proved positive health effect of inulin and FOS, the evaluation of physiological effects of inulin and FOS intake in decreasing blood lipid profile is needed, as well.

Many previous studies conducted to evaluate the health effects of these inulin and FOS bioactive compounds. However, those were done separately. Besides, using the two compounds together in Nutrafosin health functional beverage will enhance the health effect on blood lipid profile. The similar integrated characteristics of inulin and FOS influence the effectiveness in modification of lipid metabolism that in turn will affect the balance of blood lipid profile. Meanwhile, the difference characteristics of each bioactive compound enrich the health effects of the Nutrafosin beverage. This study aims to formulate Nutrafosin functional beverage containing fructooligo-saccharides (FOS) and inulin, to evaluate carbohydrate quality of Nutrafosin beverage, and to prove, clinically, physiological effect of FOS and inulin intake from consumption of Nutrafosin beverage on blood lipid profile in dislipidemia patient at daily setting food consumption pattern.

MATERIALS AND METHOD

Research Design

This experimental study was performed in five main stages : 1) inulin extraction, 2) FOS production, 3) identification of the carbohydrate quality of Nutrafosin beverage formula, 4) evaluate subject food consumption and life style, and 5) clinical trial for the health effects of Nutrafosin beverage on blood lipid profile. The first to third stages were conducted in Chemical and Biochemical, Microbiology, and Processing of Agricultural Product Laboratories. The fifth stage is a cross-sectional study, and was performed as clinical trial of Nutrafosin beverage on

dislipidemia subject which was designed as *parallel matched pairs*. Meanwhile, survey was conducted for getting food consumption, and life style data from the subject.

Sampling

The target population of this study is dyslipidemia subject and the accessible population is dyslipidemia subject who are undergoing outpatient at heart disease unit at dr. Soebandi hospital during April to June of 2010. The sample is part of a selected accessible population, and was chosen by consecutive non-probability sampling method. Every dislipidemia outpatient who fulfilled sample selection criteria (inclusion and exclusion criteria) was chosen to a certain time until the required number of patients to be studied was met, that is 16 subjects. The subjects were determined based on the following inclusion criteria : patients with dyslipidemia aged 35-70 years, with levels of LDL-cholesterol = 101-159 mg / dl, and not smoking. Conversely, exclusion criteria as follows: do extreme sports, sportsman, abdominal circumference > 102 cm (men), > 88 cm (women), have severe complications (heart failure), diabetes mellitus, a disease that would interfere with the normal diet (such as fever typhoid), consuming food and beverages prebiotics and probiotics, laxatives, traditional drinks (herbal medicine) that lowering cholesterol / triglycerides.

Experimental Design

Clinical trials of the effect of Nutrafosin beverage on blood lipid profile, was designed as a single-blind randomized placebo-controlled parallel study. The clinical trials procedures were approved by Ethics Committee of Faculty of Medicine, University of Jember (ethical clearance). The identified subjects were divided into two groups as matched pairs, namely the treatment and control groups. The similarity of the two groups will be determined based on the levels of LDL

cholesterol, triglyceride blood levels, and their medical history. Both groups received either a glass of placebo drink and Nutrafosin functional beverage taken daily for 21 days by oral administration. The drink was consumed at late afternoon drink on the sidelines during lunch and dinner. The level of blood lipid profile was measured at before (d-0) and after treatment (d - 22).

Fructooligosaccharides Production by *Aspergillus niger*

FOS production was done in four activities, namely 1) medium preparation, 2) incubation for getting starter culture, 3) incubation the starter culture in liquid medium, 4) centrifugation the culture for getting the supernatant contained FOS. Solid medium preparation (PDA) for growing *A. niger* reproduced as culture starter. Preparation of a liquid medium containing sucrose, yeast extract, CMC, sufficient distilled water, 0.5 N NaOH, and HCl 0.5 N. Twenty-five milliliters of liquid medium was inoculated with 1-2 ose of fungal isolates, then incubated in a shaker-incubator at a temperature of 37⁰C for 24 hours to get a starter culture. The starter culture was put into 500 ml of liquid medium, and incubated in a shaker-incubator at a temperature of 37⁰C for 12 and 24 hours. The fungal culture was centrifuged at 3000 rpm, 40⁰C for 15 minutes to separate the fungal mycelia. The supernatant was liquid FOS, and was analyzed by chromatography (TLC and HPLC) for qualitative and quantitatively identification of FOS.

Inulin Extraction

Dahlia tubers were cleaned and cut, then were blended with the addition of water (w: v = 1:2) and were heated at 80-90 ° C for 30 min. The filtrate was taken and 30% ethanol plus 40% of the volume of filtrate, and then stored for 18 hours, the temperature \pm - 10 ° C. Then, the solution was left at room temperature (\pm 2 hours), then centrifuged (1500 rpm, 15 minutes).

Deposition (wet inulin 1) plus water (1:2) and then heated (70 ° C, 30 min). This solution was added activated carbon 1-2% (w/v). The solution was filtered, measured in volume, and cooled at room temperature. Furthermore, 30% ethanol is added as much as 40% volume of the solution. Then cooled in the freezer for 18 hours. After the cooling phase II, the solution was thawed at room temperature and then centrifuged (1500 rpm, 15 min) to obtain a white precipitate (wet inulin II). The precipitate was dried (50-60 °C, 6-7 hours) and then pulverized to obtain inulin powder.

Nutrafosin Beverage Formulation

Liquid FOS 20 % v/v, FOS inulin powder 10 % w/v, tropicana sugar, essence, emulsifier ingredient, distilled water (up to 200 ml volume), were mixed homogeneously, and then pasteurized. The placebo was formulated without FOS and inulin. The Nutrafosin and placebo beverages were consumed in the afternoon at least 4 hours after taking the medicine.

Carbohydrate Quality Analysis Reducing sugar analysis

Solvents compose of 0.5 g DNS, 0.8 g NaOH, and 15 g of Na K tartrate in a volume of 100 ml. One millilitre of FOS liquid is inserted into the tube ependorf, then centrifuged at 5 x 1000 rpm for 10 minutes. The supernatant was poured into several tubes with different volumes / concentrations, and each added 1 ml of solvent, then vortex and heated (scale 3) until the orange-red color emerge. The reducing sugar in the supernatant was measured by spectrophotometer at λ = 560 nm.

Sucrose levels determination.

The standard solution is 0.1 g glucose / 10 ml. Samples (50 ul, 70 ul) plus 0.5 NaOH were boiled at 100⁰C for 10 minutes. Once, it is cool, add 250 ul solvent 0.1% resorcinol and 790 ul of HCl 30%, then was vortex, and incubated at -80 ° C for 8

minutes. Sucrose in the sample is measured by spectrophotometer at $\lambda = 520$ nm

Determination of levels of fructose.

The Seliwanoff reagent was prepared by mixing 3.5 ml of 0.5% resorcinol in 12 ml of 1 N HCl concentrated, and was diluted to be 35 ml with distilled water. Tests were carried out by adding 100 mL and 1 mL of sample solution into 2 ml of the reagent, then heated in boiling water for 10 minutes. Cherry red color indicate the presence of fructose in the sample, and measured by spectrophotometer at $\lambda = 500$ nm.

Analysis of water soluble fiber.

One gram fat-free sample was inserted into erlenmeyer (W). and was added 20 ml of destilated water, and its pH regulated to 1.5 by addition of HCl 4 M, then added 100 mg of pepsin. Closed erlenmeyer and incubated and agitated at 40°C for 60 minutes. Added 20 ml destilated water and adjusted pH to 6.8, and then added 100 mg of enzyme pankreatin. Closed and incubated at 40°C for 60 minutes while agitated. Furthermore, adjusted pH to 4.5, then filtered with filter paper of known weight and ash levels. Washed with 2x10 ml of destilated water. Filtrate volume was set with water to 100 ml, and then added 400 ml of ethanol 95% warm (60°C) and precipitated for 1 hour. Subsequently, filtered with filter paper of known dry weight and ash levels. Residue on the filter paper was washed with 2x10 ml of ethanol 78%, 2x10 ml of ethanol 95%, and 2x10 ml of acetone and then dried at 105°C overnight (until constant weight). Then, cooled in desiccator and weighed (D), and then was burn up in furnace at 500°C for at least 5 hours. The burn sample was cooled in a desiccator and weighed (I). Water-soluble fiber content is calculated by the following formula: $SDF = [(DI-Blank) / W] \times 100\%$

Analysis of inulin levels.

One ml of sample was added with 0.2 ml cysteine 1.5% and 6 ml H₂SO₄ 70%. The mixture was shaken, added with 0.2 ml karbazol 0.12% in ethanol solution, and then was heated at 60 ° C for 10 minutes. After cooling, inulin level was measured at $\lambda = 560$ nm. Standard curve made by using samples containing inulin more than 20 ug / ml.

Evaluation of Food Consumption and Lifestyle

The survey of consumption patterns, levels of food intake, and lifestyle information carried by visiting patients' homes to collect data by questionnaire-based interview techniques by the method of semi-enclosed 24-hours food recall and food frequency recall. Anamnesis of type and amount of food was made with the aid of food models. The number of different types of food consumed is converted into the subject of calories and macro nutrients, and fiber. The levels of caloric gained compared with the needs of the subject. Caloric needs of the subject: 1) normal weight (or BBR Relative Weight <90%) 40-60 Cal / kg body weight, 2) more weight (BBR 90-100%) 30 Cal / kg BW, 3) more weight (BBR > 110%) 20 Cal / kg BW, 4) obesity (BBR > 120%) 15 Cal / kg BW.

Statistical Data Analysis

Data of food consumption pattern and nutrient intake levels were processed and analyzed quantitatively and qualitatively, and are presented in a descriptive qualitative and quantitative. Physiological effects of FOS and inulin intake from Nutrafosin beverage consumption on levels of blood lipids was determined based on the results of analysis of variance (ANOVA) and the Duncan Test. The differences in levels of lipid fractions before and after each intervention group were analyzed with paired t-test, at 95% confidence level ($\alpha = 0.05$). Test statistic paired samples t-test was performed after

the data has a normal distribution of values tested and the data in the form of quantitative data. Testing hypothesis 1) H_0 = no difference in levels of parameters tested; H_1 = there are different levels of parameters tested: if $T_h \geq T_{tab}$ so H_0 rejected and H_1 accepted, if $T_h \leq T_{tab}$ so H_0 rejected and H_1 accepted (Ridwan, 2006). Testing hypothesis 2), if the value of $\alpha^- < 0.05$ then H_0 rejected and H_1 accepted.

RESULT AND DISCUSSION

Nutritional Value of Nutrafosin Functional Beverage

One glass (150 ml) Nutrafosin beverage contains 50 ml liquid FOS, 2 g of inulin powder, orange essens, and 3 g Tropicana sugar. Laboratory analysis showed that the nutritional value of the Nutrafosin beverages as follows : 5.6 % reducing sugar, 0,94 % fructose, sucrose 1.06 %, 0.39 % glucose, and 2.84 %.water soluble fiber, and 56.64 % inulin. This beverage was consumed by 16 dyslipidemia patients for 21 days, for evaluating the effect on their blood lipid profile.

Food Consumption Pattern of Dyslipidemia Patient

Half of the dyslipidemia from treatment group consumed energy source food (127% RDA) more than the recommended energy allowance, and above the average energy intake value (106% RDA) (Table 1). The mean value of energy from

carbohydrate rich food were 66%, more than the recommended (<55% total energy recommended allowances or REA). Similarly, the mean value of energy from protein source food above the recommended (10-15% total energy recommended), that were 129 % REA. The energy intake from lipid source food was above (57%) the recommended (20-30 % REA), as well. These consumption data explained the over energy intake from carbohydrate, protein, and lipid sources food consumed by the dyslipidemia treatment group.

Third quarth (75%) of **dyslipidemia subject control group** consumed energy source food by average energy value by 81 % REA, was lower than the average (84% REA)(Table 1). The average value of energy from carbohydrate rich food were 111 %, slightly above the energy recommended from carbohydrate (<55% total energy). Similarly, the mean value of energy from protein source food were above the recommended (10-15% RDA), that were 99%. The average energy from lipid source food was above (53%) the energy recommended (20-30 % total energy). These figure explained the over energy intake from carbohydrate, protein, and lipid sources food consumed by the dyslipidemia control groups.