THE EFFECTS OF PEPINO (*Solanum muricatum*) EXTRACT TO THE DECREASE OF GLUCOSE CONTENT IN BLOOD OF WHITE RATS *Ratus novergicus*)

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ABSTRACT

The developing countries face the health problem. One of them is degenerative disease. The prevalence of diabetes mellitus in the world is increase drastically in the last decade and it estimate this number is increase in the future In Indonesia, it increase from 2.5 million in 1994 to be five million in 2010. Manganese mineral in pepino has function as anti diabetic, in addition to the content of –sitosterol and stigma sterol as active compound as anti hyperglycemia on pepino extract.

This research aims to study the influence of pepino extract to the decrease of glucose content in blood of white rats. The population in this research is white rats *(Rattus norvegicus)* and sample in this research is 16 white rats. This research is experimental study. The collected data was primary data by take the data of experiment result, i.e. data of measurement of beginning blood glucose content and end blood glucose content of the white rats using digital glucose test.

Based on the results of statistical test using Anova test, the value of p (0.000) < α (0.05), it means that there is an influence of pepino extract to the decrease of blood glucose content on white rats. The result of analysis by Duncan test, the application of pepino extract will decrease the blood glucose contant for 67.5 mg/dl.

The application of pepino extract for 1 ml/day during 2 weeks will decrease the blood glucose content for 67.5 mg/dl

Keywords : Blood glucose contant, Pepino

INTRODUCTION

A. Background

The developing countries face the health problems and one of them is degenerative disease. The national health survey indicates that the increasing of prevalence of diabetes mellitus for 8.3% of the population in 1996. In 2003, 194 million of people in the world whose the age 20 – 79 years old are diagnosed with diabetes mellitus disease. In 2025 it estimates the number to be 72% of 333 million people in the world. (Matsura, 2005)

The data of World Health Organization (WHO) indicated that the number of patient with diabetes mellitus in Indonesia is in the fourth position after India, China, USA for 17 million people (8.6%). Even 7.5% of population in Java and Bali have diabetes mellitus (Alidjaja, 2003).

WHO estimates, the global prevalence of Diabetes Mellitus type 2 will increase from 171 people in 2000 to be 366 millin in 2030. Indonesia is in the fourth big nation with the diabetes mellitus in the world.

Pepino *(Solanum Muricatum)* as member of family *Solanaceae* (eggplant) contains gum, B-cytosterol and Stigmasterol and the lower glychemic index. The content of Manganese in pepino has a function as co-factor of any enzymes that help a process to regulate the insulin because its glychemical index is lower that delay the increasing of blood glucose content and to maintain the normal glucose content, B-cysterol and Stigmasterol tht increase the production of insulin (HGakimah, 2010).

Problem Formulation

What the influence of application of pepino *(Solanum Muricatum*) extract to the decrease of blood glucose content of white rats *(Rattus Novbergicus)*.

B. The Objective of this Research

1. General Objective

To study the influence of the application of pepino *(Solanum Muricatu*) extract to the decrease of blood glucose content of white rats *(Rattus Novergicus)*.

2. Specific Objective

a. To study the beginning blood glucose content of white rats (Before the application of glucose 1 ml/day during 1 week).

b. To study the end blood glucose content of white rats (After the application of pepino extract 0.5 ml, 0.75 ml, 0.1 ml during 2 week).
c. To analyze the influence of the application of pepino extract to the decrease of blood glucose content of white rats.

C. Purposes of Research

As information to the patient of diabetes mellitus about the influence of the application of pepino extract to the decrease of blood glucose content.

METHOD OF RESEARCH

A. Location and Time of Research

This research was conducted at chemical laboratory of Nutrition Department of Politekkes Kemenkes Medan since June up to August 2014.

B. Type and Design of Research

This research is poor experimental study using randomization.

The choosing of research object for groups and application of treatment is using RAL method with Posttest Only Design Group.

C. Population and Sample

Population in this research : white rats in species of *Rattus Novergicus Strain Wister* that consist of 16 white rats, the number of sample is 3 for each repetition and 4 treatment (X0, X1, X2, X3) and 4 reserves so it needs 16 white ratas.

1. White rats (*Rasttus novergicus*) is experiment animals in white color and body weight is 250 gr, age 2 months
2. Blood glucose content is the measurement of blood glucose content of white rats before the application of glucose 50% for 1 ml/day.
3. The end blood glucose content is the measurement of blood glucose content of white rats after the application of pepino extract in dosage 0.5 ml, 0.75 ml and 1 ml during 2 weeks.
4. Glucose 50% is 50 gr glucose crystal dissolved into 100 ml aquadest

D. Procedure of Research

The procedure of research are :

1. Preparation
   a. Cage preparation
   b. Choosing the experiment animal (male white rats)
   c. Numbering of white rats
   d. Preparation of glucose solution 50%
2. Experiment phase
   With four groups (X0, X1, X2 and X3), the experiment procedure are as follows :
   Step 1 : Adaptation during two days
   Step 2 : In the third day, the glucose 50% was applied in dosage 1 ml/day
   Step 3 : In the eleventh day, to apply the pepino extract in dosage 0.5 ml/day, 0.75 ml/day and 1 ml/day during fourteen days in group X1, X2, X3 while group X0 did not get the pepino extract and only as control. On the 26th day, the blood was took and to measure the blood glucose content on group X0, X1, X2 and X3.

Type and Method of Data collecting

The type of data is primary data

Data processing and analysis

The applied statistical test is One Way Anova Test ($p = 0.05$) to test the comparison of average of blood glucose content on white rats in each groups. If in One Way Anova test there is different average, so it need the advanced analysis (Post Hoc Test Tukey) ($p = 0.05$) to determine group with the different of average of blood glucose content on whire rat.

RESULTS AND DISCUSSION

The blood glucose content of white rats

Table of analysis of blood glucose content of white rats

No	**Treatment Group**	**N**	**KGD White rats (mg/dl)**
			Mean ± SD
1	Control (X0)	4	141.50 ± 3.10^{a}
2	Treatment (X1)	4	130.00 ± 3.55^{a}
3	Treatment (X2)	4	116.50 ± 8.58^{b}
4	Treatment (X3)	4	$95{,}50 \pm 6.55^{c}$

Note *) the different notation indicates the significant difference)$p < 0.05$)

The average of blood glucose content on group X3 has a lower content (95.50 ± 6.55) it means that the application of pepino extract in dosage 1 ml/day decrease more the blood glucose content, while the higher one is in group X0 (141.50 ± 3.10)

The result of analysis by One Way Anova indicates that there is decrease of glucose content significantly ($p<0.05$) on the treatment group of X1 (130.00 ± 3.55) if compared toi

treatment X0 (141.50 ± 3.10), treatment group of X2 (116.50 ± 8.58) and treatment group of X3 (95.50 ±6.55). based on the results indicate that the higher of dosage of pepino extract, the higher of decrease of blood glucose content on white rats. This proves that decrease of blood glucose content in dosage 1 ml give a maximum result in decr5ease blood glucose content.

Depiction of comparison of the average of blood glucose content of any groups before analysis by One Way Anova is as follows :

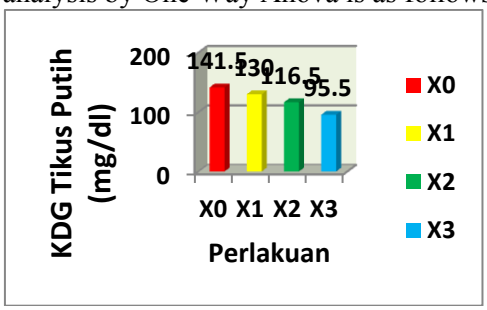

Figure : The Average of Blood glucose content of white rats.

Based on the figure, it indicates that there is change of blood glucose content that different in group X0, X1, X2 and X3. The application of pepino extract in the various dosages, i.e. 0.5 ml, 0.75 ml and 1 ml will decrease the blood glucose content of white rats. The decrease of blood glucose content of white rats is caused by the compound of β-cytosterol and stigmasterol as active compound that give an effect of anti hyperglycemic β-cysterol and st5igmasterol on pepino extract as unsaturated fitosterol. B-cytosterol and stigmasterol is a combination and compound of fitosterol that provide a good synergic effect than the single compound (Hakimah, 2010)

Based on results of Homogeneous test, p value = 0.087 (p value > 0.05) indicates that the variance of sample groups is same or homogenous. Based on results of Anova Test, p value = 0.000 (p value < 0.05) and indicates that the average of blood glucose content on treatment group is not identicfal or there is difference of average of decrease of blood glucose content on white rats by the application of pepino extract with the various dosages. Based on result of Anova Test value < 0.05 is not identical or there is difference of average, the test is continued by see the p value of the Multiple Comparison table. And p value on Multiple Comparison table, p value = 0.000 (p value < 0.05), this result indicates the average of blood glucose content on each treatment is not same.

Conclusion

The application of pepino extract for 1 ml will decrease blood glucose content of white rat for 67.14 mg/dl while the application of pepino extract for 0.5 ml will decrease the blood glucose content of white rats for 27.7 mg/dl.

Suggestion

It is sugg4ested to the patient with the higher blood glucose content to decrease the glucose content by consume pepino.

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