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Hypoglycemic Activities Of Catfish Biscuits (*Pangasius Hypophthalmus*) In White Rats (*Rattus Norvegicus*).

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ABSTRACT

Diabetes mellitus is one of degenerative diseases, which is a disease that caused by a decreasing in function or structure of tissues or organs progressively from time to time, and it is caused due to age or lifestyle choices. Moreover, it can be caused because the increasing of blood sugar (glucose) level that caused by the insulin deficiency both absolute and relative, so that the regulation of blood glucose level becomes chaotic. Hyperglycemia can be treated with diabetes mellitus therapy which is given to the patients with a target to reduce the blood glucose level to be normal or it is called hypoglycemic. This study aims to determine the hypoglycemic activities of catfish biscuits on the blood glucose level of white rats. The design of this study used RAL with 24 male mice divided into 6 treatments, namely normal with the giving of 0.5% Na-CMC 1mL/200 gram BB, negative with the giving of 0.5% Na-CMC 1mL/200 gram BB, positive with the giving of 0.45 mg/kg BB glibenclamide and 3 other treatments by giving catfish biscuits (Formula A, formula B and formula C) with 4 times replication. All treatments were injected with monohydrate alloxan with a dose of 150 mg/kg BB, except for the normal treatment. The result showed that the hypoglycemic activities of catfish biscuits can reduce the blood glucose level in white rats with the hypoglycemic power which is 42.47%.

Keywords: biscuits, hypoglycemic, catfish

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INTRODUCTION

Diabetes mellitus is one of degenerative diseases, which is a disease that caused by a decreasing in function or structure of tissues or organs progressively from time to time, and it is caused due to age or lifestyle choices. Moreover, it can be caused because the increasing of blood sugar (glucose) level that caused by the insulin deficiency both absolute and relative, so that the regulation of blood glucose level becomes chaotic.[5]. Hyperglycemia in the blood will cause glucose autoxidation, nonenzymatic proteins glycation and it will accelerate the occurrence of reactive oxygen compounds (ROS) and is one of the common signs for diabetes mellitus patient [8]. Hyperglycemia can be treated with diabetes mellitus therapy which is given to the patients with a target to reduce blood glucose level to be normal or it is called hypoglycemic.

Diabetes mellitus patients are often found with a variety of symptoms, one of them is polyphagia, which is having an increased appetite but losing the weight. Diet factor also becomes the main key in the prevention and treatment for diabetes mellitus. The inappropriate food consumption which lacks of fiber such as protein, carbohydrates, vitamins and water and also often consuming foods such as snacks or fast and practical foods can also be the factor[2]. Many people with diabetes mellitus consume snacks that are not balanced with the appropriate nutritional content and animal foods, one of them is biscuit. The biscuits that have been distributing in the market are not balanced with the nutritional content.

Based on that facts, it is necessary to make snacks in the form of biscuits that can be consumed by diabetes mellitus patients. The biscuits are often made by using animal foods and plant foods. Animal food that is often used is by adding fish extracts. One of the freshwater fish that contains high nutrition is catfish. Catfish contains omega-3 fatty acid that can control blood glucose level[6].

This study aims to determine the hypoglycemic activities of catfish biscuits on the blood glucose level of white rats.

MATERIALS AND METHODS

Chemicals

The materials that are used in this research are the catfish, distilled water, white male rats, husks, standard feeds, alloxan, 0.9% NaCl, glibenclamide, Na-CMC 0.5%, glucose test strips.

Experimental

Making of Catfish Filtrate

The stage of catfish filtrate making was that the catfish was first being weighed and then cleaned (removed its stomach contents, gills, fins, and head), the fish were washed until there was no blood and mucus. The fish that had been cleaned, then drained and weighed. A cormorant or large pan for steaming and a small saucepan for the place of the fish must be prepared. Then, aquades was added for about 10 mL in a small pan contained the fish that would be steamed. The steaming was done for 90 minutes. After the steaming process in the small pan was over, it obtained the first catfish broth/liquid/filtrate. The fish meat that had been steamed was pressed so that the fish liquid was obtained and mixed with the first catfish filtrate. To separate the remains of the fish meat fiber, the filtrate filtration was conducted. When the catfish filtrate result had been obtained, then it was being measured of its catfish filtrate rendement. Next, it was put in the sample bottle and stored in the freezer. If the albumin filtrate is stored in the freezer (a maximum 7 days), when it will consume the albumin filtrate, open the lid of the bottle and leave it at the room temperature until it melts. It was obtained 400 mL of catfish filtrate from the preparation of catfish filtrate with 2 kg catfish for about 90 minutes time of the steaming.

The Making of Catfish Biscuits

The making of fish biscuits was first by preparing wheat flour (Chakra Kembar) and fish filtrate (the concentration should be according to dose), 15 g margarine (Blue Band), 30g egg yolks (Chicken Eggs). The margarine and eggs were mixed until smooth with a mixer for about 10 minutes. Furthermore, the

wheat flour and fish filtrate were put in the mixture then mixed until smooth for about 15 minutes. After that, the dough was printed on a baking sheet, then baked in an oven at 160° C for about 30 minutes. The ripe biscuits were cooled at room temperature[10].

The Making of 0.5% Na-CMC Solution

0.5 g Na-CMC was weighed and put into erlenmeyer which contained \pm 10 mL of aquades that had been heated. Then, it was stayed for 15 minutes until the transparent mass was obtained, then mixed until homogeneous. After that the Na-CMC solution was transferred to a 100 mL volumetric flask and the volume was filled by aquades sufficiently until tera mark [3]. The giving of 0.5% Na-CMC solution was carried out orally with the dose given which was 0.5 mg/kg BB rats.

The Making of Glibenclamide Solution

Glibenclamide which was weighed for about 5 mg then was finely crushed, and then dissolved in 1% Na-CMC solution in a 25 mL volumetric flask. The dose given to the rates was 0.45 mg/kg BB of rats (Appendix 1)[9].

The Making and Inducing of Alloxan Solution

According to Li (2009) in Akrom (2014), the short procedure of the alloxan solution making is monohydrate alloxan powder being weighed for about 0.5 g then dissolved with aquades until the volume of 10 mL. The given dose was 150 mg/kg BB of rats by intraperitoneal injection (Appendix 1). The alloxan which had been dissolved was immediately injected before the color changes. The tested animal which had been induced by alloxan was kept silenced for 3 days and was checked its blood glucose level, if there is no increasing, then it will be injected again with alloxan solution. The increasing in the blood sugar level in the tested animal reached \pm 200 mg/dL, so it can be said that the tested animal have diabetes.

Feeding Treatment and Measurement of Glucose Level

The tested animal that had been fasted for 12 hours and measured its blood glucose level then given the feeding treatment (catfish biscuits) 5 grams per serving orally and dissolved in cold aquades[7], during the 15 days of giving water through ad libitum(unlimited) and balanced with standard feeding. The measurements then were made 6 times on the 1st,3rd,6th,9th,12th day and the last day of treatment which was on the 15th day[4]. The steps for blood glucose level measurement were as follows:

1. The rats' tail was cleaned and injured
2. The blood was taken using a glucometer strip
3. The result of blood glucose level was awaited for 10 seconds

RESULTS AND DISCUSSION

The treatment which was given to the tested animal was done by calculating the hypoglycemic power to find out the potential of catfish biscuits and other treatments. The result of the hypoglycemic power calculation in the fish biscuits treatment showed that the formula C given treatment had bigger percentage which was 42.17% compared to the formula A, which was 14.69% or the formula B which was 41.76%. This situation led to the decreasing of blood glucose level in the formula C treatment became better. The hypoglycemic power in the positive control treatment was 68.40%, it is because on the first day, the level of blood glucose in the calculation curve had hyperglycemia and there was a decline again on the third day until the fifteenth day. The result of hypoglycemic power calculation can be seen in the Table 1 below:

Table 1: Hypoglycemic Power in all treatments

Treatments	N	Hypoglycemic Power
Normal	4	9.20 %
Positive	4	68.40 %
Formula A	4	14.69 %
Formula B	4	41.76 %
Formula C	4	42.47 %

Information :

N: The number of tested animal in one treatment

The percentage of hypoglycemic power indicated the ability to reduce blood glucose level in a certain research. The greater the percentage of the hypoglycemic power, it makes the ability to reduce blood glucose also becomes greater[8]. The hypoglycemic power in all treatments showed that the formula C treatment was higher than the formula A or the formula B. It means that the formula C treatment was able to inhibit the increasing of the blood glucose level of rats, respectively for about 14.69%, 41.76% and 42.47% (Table 1). The formula C treatment with the composition (wheat flour: 2.75 grams; fish filtrate: 1.5 grams; egg yolks: 0.25 grams; margarine: 0.5 grams) was close to the hypoglycemic ability of glibenclamide which had the percentage of the hypoglycemic effect which was 68.40%.

CONCLUSION

Hypoglycemic activity of catfish biscuits can reduce the blood glucose level in white rats with a hypoglycemic power of 42.47%

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