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Analysis Potential of Dadih as a Treatment for Diabetes Mellitus Based on Histopathological Images of the Pancreas in Mice (Mus musculus)

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ABSTRACT

The pathogenesis of Diabetes Mellitus is complex with one of the basic factors causing the disease is oxidative stress. Foods containing probiotics are reported to suppress oxidative stress. Probiotics containing L.acidophillus and L.casei are known to reduce oxidative stress and are antidiabetic. This happens because L. casei can reduce oxidative stress and suppress CD4 cells effectively, accompanied by a reduction of pro-inflammatory molecules so that it has an antioxidant effect but can also modulate the immune system. To see the role of dadih in this study, the research will be conducted using mice which are divided into three groups, namely the negative control group, the positive control group and the treatment group randomly. Blood sampling aims tomeasure blood glucose levels of mice using a glucometer. Histological observation of the mice's pancreatic organs was carried out to determine theantidiabetic effect of curd. The results of the One-Way ANOVA test showed that there was a significant difference in each treatment group (p=0.000). Giving curd can improve the pancreas of mice with diabetes mellitus seen from the histopathological picture that has pyknosis. The pathogenesis of Diabetes Mellitus is complex with one of the basic factors causing the disease is oxidative stress. Foods containing probiotics are reported

Introduction

Diabetes mellitus is the cause of diseases such as blindness, heart disease, kidney failure, and even death and premature infancy in pregnant women with diabetes mellitus (DM)[1,11,12]. Diabetes mellitus is a chronic disease characterised by the inability to control blood glucose levels. So that the body will experience hyperglycaemia. This disease is caused by two conditions, namely pancreatic organ damage (type 1 DM) and insulin resistance (type 2 DM)[2,12,13].

To control blood glucose levels, patients usually take various medications, lifestyle modifications, and dietary changes. Meanwhile, the American Diabetes Association (ADA) does not recommend the consumption of supplements, due to their unclear efficacy and non-standardised formulations. Meanwhile, interest in the treatment of Diabetes Mellitus by consuming probiotics is growing.

Probiotics are known to improve host health beyond the natural nutrients in the body and are used as an alternative therapy to balance the gut mycoflora in DM patients with gut microflora imbalance [3,9]. The pathogenesis of diabetes mellitus is complex with oxidative stress being one of the underlying factors causing the disease. Foods containing probiotics are reported to suppress oxidative stress. Probiotics containing L.acidophillus and L.casei are known to

reduce oxidative stress and are antidiabetic. This occurs becauseL.casei can reduce oxidative stress and suppress effectiveCD4 cells, accompanied by a reduction in pro-inflammatory molecules so that it has an antioxidant effect but can also modulate immunity (4,4).

Probiotics reduce fasting blood sugar, insulin sensitivity, and reduce inflammation as well as antioxidants in Type 2 DM patients (5,12). Probiotics contribute to the metabolic balance of anti-inflammatory and pro-inflammatory responses by different mechanisms. Probiotics play a role in improving communication between the immune system so that immune and inflammatory tolerance in the digestive system will reduce the risk of inflammation.

There are many probiotics on the market and are packaged in the form of drugs and food. Dadih is a type of traditional yoghurt derived from buffalo milk fermented at a temperature of about 27-33^{o} C for 24-48 hours which is famous in West Sumatra and contains bacterial starters (6,10). Referring to the research of Melina, et al showed that giving curd can significantly reduce fasting blood glucose levels and increase insulin (7). Surono, et al showed that the administration of curd containing the bacteria L. plantarum IS-10506 bacteria can improve the intestinal microbiota health in rats that experience DM (8,11,13).

Method

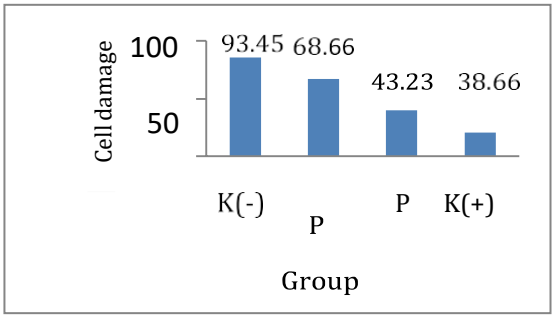
The research design used in this study is an in vivo experimental design using experimental animals. The samples of this study were Balb/c mice and were divided into 3 groups. Positive control group (distilled water), negative control group (distilled water and alloxan) where alloxan was injected intraperitonially for 2 consecutive days, treatment group (distilled water, alloxan and curd). After alloxan was injected, curd was given at a dose of 112 mg/g/BB mice per day gastrointestinally for 30 days.

The number of samples was calculated based on the Federer formula so that the number of mice needed = 3 x 9 = 27 mice. Categorical data from the examination results will be analysed using the T test if the data is normally distributed, while if the data is not normally distributed, the Man Whitney test is used to see the difference between the two groups. Data analysis was carried out with a confidence level of 5%.

Results and Discussion

Percentage of cell changes -pancreatic cells that are damaged:

Table 1. Mean percentage results of pancreatic cell damage

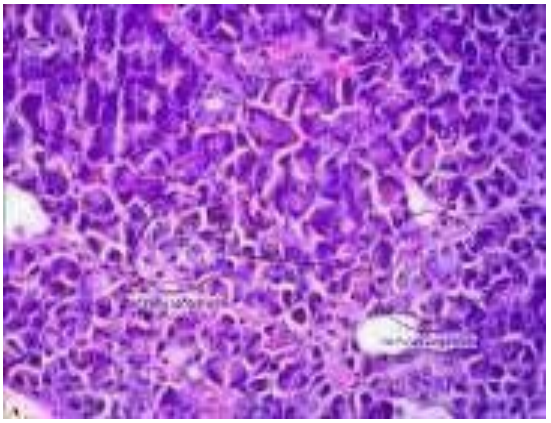


Description:

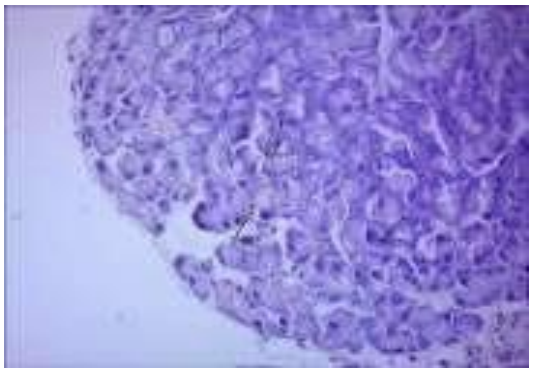
K(-) = Negative control

groupP = Treatment group

K(+)= Positive control group



Picture 1. Normal Group



Picture 2. Pyknosis Group

The results of the study of the administration of ethanol extract of pineapple fruit (Ananas comosus (L.) Merr) on changes in the histopathological picture of the pancreas in the normal group did not experience damage such as piknosisteori and/or similar research results.

The negative control group is a group of mice induced by alloxan but not given curd. The results of observations of pancreatic cell damage in the K (-) group obtained a histopathological picture of pancreatic cells experiencing pycnosis is 93.45%. Pancreatic cell damage is caused by exposure to alloxan. Oxidative damage caused by alloxan causes a decrease in the diameter of the islets of Langerhans. Alloxan can also damage biomacromolecules such as lipids, phospholipids, and carbohydrates which are components of the cell wall and DNA in the cell nucleus [9,12]. Group P which was given curd as much as 112 mg/g/BB mice per day gastrointestinally found a histopathological picture of the pancreas that experienced pycnosis by 68.66% and 43.23%.

This is in accordance with the pathogenesis of Diabetes Mellitus is classified as complex with one of the basic factors causing the disease is oxidative stress. Foods containing probiotics are reported to suppress oxidative stress. Curd, which is one type of probiotic from West Sumatra containing L. acidophillus and L. casei, is known to reduce oxidative stress and is antidiabetic (7). This happens because L. casei bacteria can reduce oxidative stress and suppress effective CD4 cells, accompanied by a reduction in pro-inflammatory molecules so that it has an antioxidant effect but can also modulate immunity. Probiotic administration reduces fasting blood sugar, insulin sensitivity, and reduces inflammation and as an antioxidant in patients with Type 2 diabetes [8,9,10].

The One-Way ANOVA test results showed that there was a significant difference in each treatment group (p=0.000). Probiotics contribute to the metabolic balance of anti-inflammatory and pro-inflammatory responses by different mechanisms. Probiotics play a role inimproving communication between the immune system so that immune and inflammatory tolerance in organs will reduce the risk of inflammation [6]. repair pancreatic cell damage.

Conclusions

1. Giving curd can improve the pancreas of mice with diabetes mellitus seen from the histopathological picture that experiences pycnosis.
2. Probiotic curd which is a typical food from West Sumatra can be used as an alternative therapy to help patients with diabetes mellitus in terms of controlling blood sugar.
3. Giving curd as an alternative therapy cannot replace insulin therapy as a whole for the treatment of diabetes, but can be given simultaneously to further optimise the process of controlling blood sugar.

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