

Literatur Review

The Effect of Ethanol Extract and Fruit Fraction of Chayote (*Sechium Edule* (Jacq.) Swartz) on Oxidative Stress and Leptin Leptins in Wistar Brain White Rats (*Rattus Novergicus* Sp.) High-Fatty Diet Induced Obesity

Siska Veronika¹, Jekson Martiar Siahaan^{2,3}

1. Student of Masters Program in Biomedical Sciences, Faculty of Medicine, Universitas Methodist Indonesia, Medan

2. Department of Physiology, Faculty of Medicine, Universitas Methodist Indonesia, Medan

3. Department of Molecular Biology, Masters Program of Biomedical Sciences, Faculty of Medicine, Universitas Methodist Indonesia, Medan

* Correspondence: e-mail: jekson.siahaan.sked@gmail.com

Abstract

Background: The purpose of this study was to analyze the effect of ethanolic extract of chayote on oxidative stress of obese white rats of wistar strain (*Rattus novergius* Sp.) induced by a high fatty diet.

Method: This study uses a type of experimental laboratory research design post-test randomized controlled group. Researchers measured the effect of treatment (intervention) on the experimental group by comparing the experimental group with the control group. The sample was obtained by a simple random sampling method. Experimental sites and other research materials can be said to be homogeneous. This study will measure MDA levels as a biomarker of oxidative stress, IL-6 as a sign of inflammation, bodyweight as obesity, leptin levels as a biomarker of appetite and lipid profile levels. The research was conducted at the Biomedical Laboratory of FK UMI and started the acclimatization process, giving experimental animal surgery treatment at the animal house of FK UMI

Results: The results of the study concluded that the effect of chayote ethanol extract can affect oxidative stress which has potential as anti-obesity and hypolipidemia and antioxidants.

Conclusion: Ethanol extract and chayote fruit fraction have antiobesity

Keywords: Oxidative stress, MDA

INTRODUCTION

Obesity is a common disease found in today's society, but often people don't care about the situation and even underestimate it, because there is a public perception that obesity is a sign of prosperity or a symbol of high social status. This perception is certainly dangerous because obesity can cause disability, morbidity, and premature mortality.[1]

Obesity is a multifactorial disease, which occurs due to the accumulation of excessive fat tissue so that it can interfere with health. Obesity occurs when large and the number of fat cells increases in a person's body. When a person gains weight, the size of fat cells will increase, and then the number will increase.[2] Globally, global obesity has doubled since 1980. More than 1.9 billion adults, 18 years of age or older are overweight, and more than 600 million people are obese. 39% of adults aged 18 years were overweight in 2000, and 13% were obese. 41 million children under the age of 5 are overweight and obese.[3]

Obesity is associated with diabetes mellitus (DM), cardiovascular disease, cancer, asthma, sleep disorders, liver disorders, and infertility. Oxidative stress plays an important role in the occurrence of complications. The

biochemical mechanism of obesity is induced by systemic oxidative stress such as superoxide derived from NADPH oxidase, oxidative phosphorylation, glyceraldehyde autooxidase, activation of protein kinase C, polyol pathway, and hexosamine. In addition, oxidative stress is exacerbated by hyperleptinemia, low antioxidants, chronic inflammation characterized by the presence of TNF-, IL-6, and IL-1 as an early inflammatory response. IL-6 and IL-1ra (IL-1 receptor antagonist) and the formation of Reactive Oxygen Species (ROS). Factors that influence the occurrence of obesity include genetic factors, food intake, physical activity, environmental factors, socio-economic.[4]

IL-6 is a pleiotropic cytokine produced in response to tissue damage and infection. IL-6 plays an important role in promoting appropriate immune responses during some viral infections, others link this cytokine with exacerbations of viral disease. This latter finding supports the hypothesis that upregulation of IL-6 during certain viral infections may increase viral survival and/or clinical disease exacerbation.[5]

Chayote contains 8 flavonoids namely 3 C-glycosyl and 5 O-glycosyl flavones, which have antihyperglycemic, anti-insulin

resistance, antihyperlipidemic, antiobesity, antioxidant, and antiproliferative effects on cervical cancer.[6]

Siahaan, et al., 2020 conducted a study on white male rats of type 2 diabetes model given the ethyl acetate fraction of 100 mg/kg BW can reduce fat mass and inhibit the mobilization of peripheral fat to plasma by inhibiting the performance of lipase and – glucosidaseenzymes.[7] Perez, et al., 2019 conducted a study in adults with metabolic syndrome who were given three capsules of *Sechium edule* var. *nigrum spinosum* 500 mg for six weeks can reduce blood sugar levels, total cholesterol, triglycerides, increase HDL and reduce inflammation and oxidative stress.[8]

METHODS

This research is research using the literature study method or literature review. A literature review is a comprehensive overview of the research that has been done on a specific topic to show the reader what is already known about the topic and what is not known, to seek rationale from research that has been done, or for further research ideas.

The data used in this study comes from the results of research that has been carried out and published in

national and international online journals. In conducting this research, the researchers searched for research journals published on the internet using the Google Scholar and PubMed search engines. research is a research using literature study method or literature review. A literature review is a comprehensive overview of the research that has been done on a specific topic to show the reader what is already known about the topic and what is not known, to seek rationale from research that has been done or for further research ideas.

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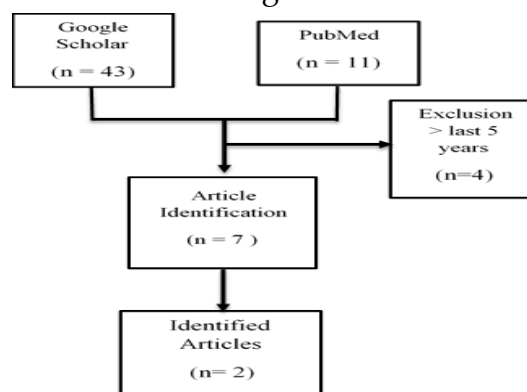


Figure 1.Diagram using the Google Scholar and PubMed search engines

RESULT

Based on the literature search, there were 7 studies related to chayote on oxidative stress and leptin levels in experimental animals with high Fatty Diet-induced obesity. According to Monica Rosa Loizzo, et al., 2016 said the composition of chayote. To that end, different hydro-alcoholic mixtures (50-100% ethanol content) were used to recover the phenolic compounds by ultrasound-assisted extraction (UAE) and the H compound was diosmetin 7-O-rutinoside (23.8%).

DISCUSSION

Sechium edule bark, leaves, and pulp were investigated for their chemical composition (total content of phenols, flavonoids, carotenoids, and vitamin C), and for antioxidant activity and inhibition of carbohydrate hydrolyzing enzymes (α -amylase and α -glucosidase). To evaluate the incidence of the ripening process on the retention of healthy phytochemicals, the pulp was subjected to different treatments. The cooking process reduced the total phenol content (58.5 mg/g extract for fresh pulp vs. 26.3 and 29.3 mg/g extract for roasted and steamed samples). The pulp was found to be most active in 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) (IC₅₀ 0.1 mg/mL), while the skin showed the highest activity in the 2,2-diphenyl-1 test. α -picrylhydrazyl (DPPH) (IC₅₀ 0.4 mg/mL). In addition,

the skin showed the highest inhibitory activity against α -amylase with an IC₅₀ of 0.2 mg/mL.

CONCLUSION

By the background of the problem and the purpose of the literature review from several journals, it can be concluded that there is a significant relationship between *Sechium edule* with obesity, wherefrom several studies that have been previously described the antiobesity effect of *Sechium edule*.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest in this study

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