

Garlic, Ginger, and Lemon Aqueous Extract: Prevention of Degenerative Diseases in Old Rats with High Fat Dietary

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Abstract: Degenerative diseases occur in person old deal with decreased metabolism. A strict diet in person old ages is very difficult. The study aims were to evaluate increased of glucose and subcutaneous adipose abdominally tissue that impact to decrease of the coronary arteries diameter. This study is an experimental study using 28 Wistar rats, male, age 52-54 weeks, divided into 5 groups, Group1 (normal control), Group2, 3, 4, and 5 were fed high fat, Group 2 (lemon and garlic), Group3(ginger and lemon), Group4 (negative control), Group5 (garlic, ginger, and lemon), treated as long 30 days. Parameters measured are glucose, subcutaneous adipose abdominally tissue and coronary artery diameter of the heart. The results showed glucose levels in negative control was the lowest ($p = 0.001$). Subcutaneous adipose abdominally tissue lowest in a group treated with garlic and lemon ($p = 0.641$). The smallest diameter of the coronary artery occurred in the group treated with garlic, ginger, and lemon ($p = 0.952$). The study showed an aqueous extract of garlic, ginger, and lemon could reduce blood sugar levels and subcutaneous adipose abdominally tissue. This study needs to be developed, especially study in bioactivity of active compound that regulated lipid profiles.

1 INTRODUCTION

Going old is a certainty but early aging deal with degenerative diseases, such as diabetes mellitus, hypertension, stroke, and heart diseases. Aging relate to free radicals like reactive oxygen species (ROS) (Blagosklonny, 2008). Its increase due to a decrease in metabolic ability related to cell fatigue due to depletion of mitochondria energy (Neil-Sherwood, 2018).

Decreased metabolic ability causes accumulation of fat which causes obesity. Obesity is a mild inflammation that will increase ROS cause oxidative stress (Fernández-Sánchez et al., 2011). Oxidative stress is a condition when free radicals and antioxidant in unbalance stage in cellular level (Yulianti et al., 2012). It will cause proteins, lipids, carbohydrates and nucleic acid oxidized (Hasani-Ranjbar et al., 2013). This due to degenerative diseases, such as increased glucose in plasma, accumulation of fat especially in the abdomen.

Oxidative stress condition handle with antioxidants as a supplement alternatively.

Antioxidants in herbs widely used to lose weight, such as ginseng, green tea, oranges, soursop already have a preclinical base evident (Hasani-Ranjbar., 2013, Liu et al., 2017). Meanwhile, garlic and lemon aqueous extract significantly reduce the weight of rats with a high-fat diet, but ginger even raises weight (Yulianti et al., 2017).

Does the aqueous extract of garlic, ginger and lemon can prevent degenerative diseases? In this study, old rats fed high fat and treated with a mixture of garlic, ginger, and lemon with the aim were analyzing changes in plasma glucose concentration, fat deposits, and coronary artery diameters.

2. METHODS

This study was an experimental study by using old rats fed high fat (Figure 1). Twenty-eight Wistar rats, male, age 52-54 weeks, divided into 5 groups, Group1 (normal control), Group2, 3, 4, and 5 were fed high fat, Group 2 (lemon and garlic), Group3(ginger and lemon), Group4 (negative control), Group5 (garlic, ginger, and lemon), treated

as long 30 days. Parameters measured are glucose, subcutaneous adipose abdominally tissue and coronary artery diameter of the heart.

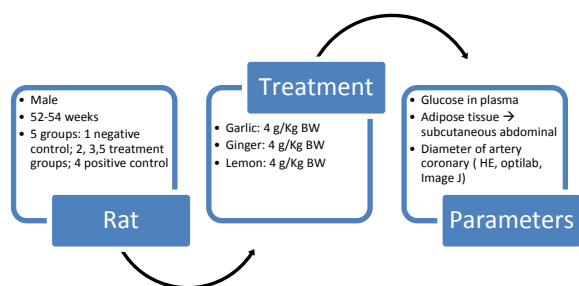


Figure 1. Research method

3. RESULT

Glucose concentration in plasma showed in figure 2. Rats treated with garlic, ginger, and lemon significantly different from the normal control group ($p=0.005$). Glucose concentration in normal control lowest than negative control. Normal control significantly different from the group treated with garlic and lemon and a group treated with garlic, ginger, and lemon. In this result, glucose plasma in the normal control relatively lowest among the group. That means rats fed high fat due to increase glucose in plasma and treated with garlic, ginger, and lemon did not reduce plasma glucose levels in plasma.

Fat deposited in abdominal subcutaneous in normal control relative highest than negative control (Figure 3). Rats treated with garlic and lemon had fat deposited in abdominal subcutaneous lowest among the group, although not significantly different ($p=0.641$). That means rats fed high fat and treated with garlic, ginger, and lemon did not reduce deposited fat in abdominal subcutaneous.

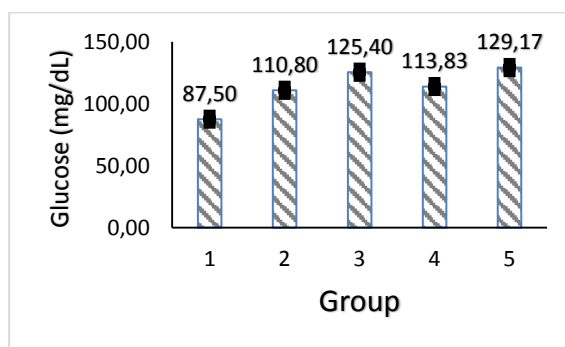


Figure 2 Glucose concentration in plasma
Note group 1 normal control, group 2, 3,4,5 fed high fat. Group 2 treated with garlic and lemon, 3 ginger and lemon, 4 negative control, 5 treated with garlic, ginger, and lemon.

The diameter of the artery coronary in negative control relative higher than the normal control. Rats treated with garlic, ginger, and lemon not caused artery coronary diameter withed ($p=0.952$).

4. DISCUSSION

Old rats fed high-fat feeds will increase glucose levels in plasma. Aging is closely related to insulin resistance (Horwich et al., 2011). The results showed glucose levels in normal control was the lowest. High fat fed due to increasing glucose plasma concentration, but treated with garlic, ginger and lemon with doses 4 g/BW/day have not been able to reduce glucose levels in plasma, so to determine optimal dose must be reviewed.

Subcutaneous adipose abdominally tissue lowest in the group treated with garlic and lemon. Garlic and lemon. Garlic and lemon could lose weight, but so far there has been no scientific evidence, but only from an herbalist experience. This study proves that a mixture of garlic and lemon can reduce weight significantly (Yulianti et al., 2017).

The smallest diameter of the coronary artery occurred in the group treated with garlic, ginger, and lemon. The expectation was garlic, ginger and lemon will increase the diameter of the coronary artery. But, in this study shows the opposite. Study in young men obesity (Fernhall et al., 2013) that obesity caused changes in the artery diameter profile. In this study, the rats were fed with high fat had an artery diameter was relatively larger than other groups. This needs further investigation.

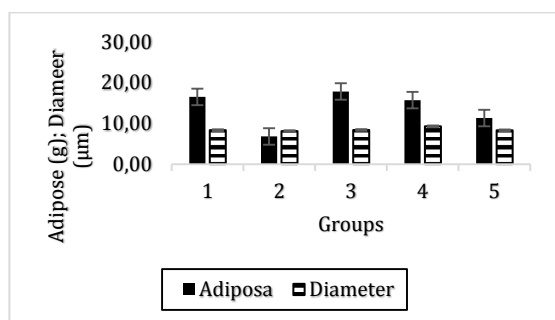


Figure 3 Fat deposited in abdominal subcutaneous (Black) and diameter of artery coronary (Striped) Note group 1 normal control, group 2, 3,4,5 fed high fat. Group 2 treated with garlic and lemon, 3 ginger and lemon, 4 negative control, 5 treated with garlic, ginger, and lemon.

5. CONCLUSIONS

Glucose concentration in plasma increase deal with aging. The study showed an aqueous extract of garlic, ginger, and lemon increase glucose concentration in plasma and subcutaneous adipose abdominally tissue. But no effect in artery coronary diameter. This study needs to be developed, especially study in bioactivity of active compound that regulated lipid profiles

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