



## The Effectiveness of Cherry Leaves Decoction (*Muntingia Calabura L*) Towards SGOT SGPT Serum on Male Wistar Rats in Critical Hepatitis Model

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### ABSTRACT

Critical Hepatitis is caused by viruses, alcohol and drugs which are characterized by the increasing values of SGOT SGPT. The aim of this study is to determine the effectiveness of decoction extracts of cherry leaves (*Muntingia Calabura L*) towards serum SGOT SGPT on male wistar rats in critical hepatitis model. The rats that have been used are in number of 30 male rats with the weight is 180-200 grams and the age of 2-3 months divided into 3 groups, which are negative groups, positive groups and treatment groups. Each group consists of 10 rats. The negative group is given an usual food and drink. The positive group and the treatment group are induced with 120 mg/ oral paracetamol for 7 days to increase serum levels of SGOT SGPT. The treatment group is given a decoction therapy of 10 grams cherry leaves in 100cc of water that is given 3.6cc/oral for 7 days. While the positive group is only given a regular food and drink for 7 days. ANOVA test is conducted to analyze this study by using SPSS 24 version. It is found in the result of the study that there are significant differences in serum level of SGOT between the treatment group, positive group and negative group ( $p < 0,05$ ). There is a significant value difference of SGPT in the treatment group and the positive group ( $p < 0,05$ ). However, there is no significant difference between the level of SGPT in the treatment group and the negative group ( $p = 0,121$ ). The conclusion is cherry leaves decoction (*Muntingia Calabura L*) has an effect towards the decrease of SGOT SGPT serum level on male wistar rats in critical hepatitis model.

**Keywords:** Paracetamol, SGOT, SGPT, *Muntingia Calabura L*

### INTRODUCTION

The liver is one of the most important organs in our body where it is the metabolic center of the body. The liver has the function of metabolizing carbohydrates, proteins, fats, vitamins and medicines (Depkes RI, 2007). The liver is the main site of drug metabolism which is also called biotransformation and the end result of this reaction is a substance that is not active and is more soluble in water, so it is quickly excreted through bile and urine (Puspitasari, 2010 in Noer Indah Kumalasari, 2017). One of the functions of the liver is detoxification, so that the liver is very susceptible to being targeted by a chemical compound (Aslam, 2003 in Tanti Aziziah et al, 2015).

Acute hepatitis is a disease caused by viruses, alcohol, drugs and ischemic conditions that are marked by increased Levels of serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) in the liver. Most liver damage is caused by drugs and alcohol which often occur in developed and developing countries. (Depkes RI, 2007). Liver damage that occurs due to alcohol can cause alcoholic liver disease *fatty liver*, alcoholic hepatitis and liver cirrhosis (Fiqh Kartika et al, 2016). Damage to liver cells can be caused by a variety of other chemical compounds that have hepatotoxic power, including paracetamol (Puspitasari, 2010). Damage to the liver organ can be detected by biochemical examination of the liver using a group of transaminase enzymes, namely Serum Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase (SGPT) (Abyan Mursyid, Ariosta, Dwi, 2019) . This examination is performed on patients who have signs and symptoms such as jaundice, fatigue, pruritus, dark urine and light colored stools. This examination is also carried out for patients at high risk for contracting the hepatitis virus (family or relatives of patients), heavy alcohol drinkers, family history of liver disease, use of certain amount of drugs doses that can cause damage to the liver and also patients with diabetes mellitus (Ronika C, 2012 in the Tri Asmara, Taufik Eko, 2017). Damage to liver cells will trigger the SGPT enzyme released in high amounts because the cells in the liver that are damage, this condition will cause the transaminase enzymes in the liver to exit and enter the bloodstream, so that biochemical examination in the serum often arises an increase in Glutamate Pyruvate Transaminase Serum (SGPT) (Tanti Aziziah et al, 2015).

Paracetamol or acetaminophen is one of the drugs included in the retinal analgesic antipyretic group that was discovered in 1893 and it commonly used among the wider community to treat fevers and headache relief. Paracetamol is also used as a pain reliever from mild to moderate pain (Louis, 2003). The way of paracetamol work is by inhibiting weak prostaglandins in body tissues (Toms L, 2012). Paracetamol has proven its analgesic and antipyretic effects, but its anti-inflammatory effect is very weak and is widely used as a post-operative acute pain reliever (Tri Asmara, Taufik Eko, 2017). Paracetamol is very popular among the people due to easiness to find and affordable price (Louis, 2003). Paracetamol is a major cause of acute liver failure in the United States and almost all cases occur due to accidental overdose. This drug is generally considered safe, but at high doses can cause death. In 2006, the *American Association of Poison Control Centers* recorded nearly 140,000 poisoning caused by paracetamol in which more than 100 patients died. According to a statement from the *American Association for the Study of Liver Diseases* (AASLD), the incidence of paracetamol associated with liver toxicity

is the most common cause of acute hepatitis (Corey, 2012). Although these drugs are generally considered to have a better level of safety, paracetamol has high-dose side effects such as it can increase the risk of upper digestive disorders and disorders of the liver ("Larson, Polson, Fontana, Corey" and).

Medicinal plants or herbal medicines which have long been used by the people of Indonesia as an alternative treatment for disease prevention, for healing, and health recovery and to improve health status. Plants that grow around us contain a lot of compounds that have medicinal properties that can naturally be used to maintain health and at the same time to treat diseases. The use of herbs or herbal medicines for handling health has been highly developed pesa t along with the development of the current era (Hernani, 2011).

The efficacy of herbal medicine not only comes from the active ingredient, but from other supporting materials such as vitamins and minerals. Herbal ingredients are used in the form of plant extracts such as roots and leaves, which are used to treat fevers, coughs, colds, headaches, stomachaches and other illnesses. People's life patterns tend to return to nature so they prefer to use natural medicines which are believed to have no side effects and cheaper than chemical drugs (Hernani, 2011). The use of plants as medicinal ingredients by the community is one of the traditions and beliefs that have been carried on for generations. Traditions in the use of these plants have been partially proven to be scientifically correct, but there are many advantages of herbals that have not been disclosed or researched. Nowadays, modern citizens are rarely used medicine plant. So that most people today do not recognize plants that are beneficial for health. Therefore, growing - plants that efficacious as the drug is being around people need to be exhumed and developed. Research on identifying medicinal plant species is important to be done before these species are extinct or not conserved by the community at this time due to the lack of knowledge about the use of plants as herbal medicines that are efficacious for health (Husain, 2015). Most Indonesia's citizens directly feel the efficacy of herbal plants, its is very usefull, easy to find; the ease of finding plants or even most many people plant it in their back yard and for the price this kind of medicine is relatively cheap. Almost every Indonesian has ever used herbal medicine to treat diseases that arise both when he was a baby, childhood, and after adulthood (Zein U, 2005 in Citra Hadi Kurniati, Atika Nur Azizah, 2018 ). The use of herbs or herbal medicines in general is considered safer than the use of modern or chemical drugs. This is caused because traditional medicine has relatively fewer side effects than modern medicine (Lusia, 2006 ).

Cherry leaves are flowering plants Latin called as *Muntingia calabura L* included the family of *elaocarpaceae*. This plant has fruits that are often consumed by children, and even these plants grow well in less fertile lands and can tolerate acidic, alkaline and drought conditions (Mahmood ND, 2014). One of the plants that can be used as medicinal plants is *Cherry (Muntingia calabura L.)* which has antibacterial substances that have been tested (Sara, 2016 in Fajar Setiawan, Lusi Nurdianti, 2019). *Cherry leaves (Muntingia calabura L.)* are efficacious as a cough medicine and phlegm slough, the ripped fruit can be also used for jaundice. Cheng *et al* (2006) and Zakaria *et al* (2007) reported that cherry leaves containing flavonoids that own the benefits of hypotensive, anti-nociceptive, antioxidant, anti-proliferative and anti-microbial properties through isolation of staphylococcus. Phytochemicals entities in cherry leaf extract (*Muntingia calabura L.*) indicate the presence of various antioxidant compounds such as flavonoids, saponins, tannins, and phenolic (KP Balakrishnan, N Narayanaswamy, Duraisamy A, 2011).

The purpose of this study was to determine the effectiveness of water extracts of cherry leaves (*Muntingia Calabura L*) toward (SGOT) and Serum Glutamate Pyruvate Transaminase (SGPT) in male wistar strain rats with acute hepatitis model.

## METHODS

The research method used was an experimental laboratory and One Way ANOVA test was performed to analyze the result. The subject of the study was 30 male Wistar strain rats weighing 180-200 grams with age of 2-3 months and the rats were adapted for 7 days in a 12 hour bright and 12 hour dark condition. The rats then grouped into 3 groups; negative control, the positive controls group and the treatment group. Each group consisted of 10 male Wistar strain rats. The negative group was only given food and drink as usual. The positive group was given food and drink but the liver was destroyed using paracetamol 120 mg/ orally and was not given the treatment of cherry leaf decoction (*Muntingia calabura L*). The treatment group was given food and drink as usual and the liver was destroyed using 120 mg / paracetamol orally and then given a 10 gram decoction of cherry leaves (*Muntingia calabura L*) in 100 cc of water given 3.6 cc / orally. The object of the study was observed changes in body weight not less than 10% of the initial body weight. To check the (SGOT) and (SGPT) enzyme, it is done by taking a blood sample directly by cutting the tail of a male wistar strain.

## RESULTS

The subject of research, amounting to 30 male Wistar strain rats adapted for 7 days then divided into 3 (three) groups: negative group, positive group and treatment group and each group consisted of 10 Wistar strain male rats.

1. The first group was the treatment group: 10 male Wistar rats were inducted with 120 mg / day of paracetamol induction for 7 days and were given food to drink as usual and get the treatment of cherry leaf decoction (*Muntingia calabura L.*) .
2. Positive control group: 10 male Wistar rats were given normal food and drink then induced paracetamol as much as 120 mg / oral for 7 days but were not given therapeutic application of cherry leaf decoction (*Muntingia calabura L.*) .
3. Negative control group: 10 male Wistar rats were only fed and drunk as usual.

The treatment group and positive control group were induced paracetamol on day 8 for 7 days to increase serum glutamate oxaloacetate transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) in the liver of male wistar strain rats. Then on the 15th day the researchers examine Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase (SGPT)serum of each group, and on the 15th day, the researcher startedto give a treatment of cherry leaf decoction (*Muntingia calabura L.*) as much as 10 grams in 200 cc of water The cold was then boiled to 100 cc within  $\pm$  4 minutes 30 seconds to the treatment group for 7 days while the positive and negative control groups were only given food and drink as usual. Then on the 22nd day, the researcher re-examined Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase ( SGPT )Serum in each group to compare pre-test results that had been done previously.

**Table 1 .** The results of serum levels of serum glutamate oxaloacetate transaminase (SGOT) were found on day 15 in male wistar strain rats .

sgot_pre	1.00	2.00	-18.16000	16.50505	.222
		3.00	208.76000 *	16.50505	.000
	2.00	1.00	18.16000	16.50505	.222
		3.00	226,92000 *	16.50505	.000

	3.00	1.00	- 208.76000 *	16.50505	.000
		2.00	- 226.92000 *	16.50505	.000

Based on the table above shows that after the research object was induced paracetamol 120 mg / oral for 7 days and before the research object was given a treatment of cherry leaf decoction (*Muntingia calabura L.*) there was no significant difference between group 1 namely the treatment group with group 2 namely the positive control group due to an increase in serum levels of Serum Glugraduated Oxaloacetate Transaminase ( SGOT), it is caused by inducing 120 mg / oral of paracetamol for 7 days (p = 0.522). In the table above shows a significant difference in serum levels of serum Glu graduated oxaloacetate transaminase (SGOT) between group 1 (treatment group) and group 3 (negative control group) (p <0.05).

**Table 2 .** The results of Serum GluevelsOxaloacetate Transaminase (SGOT)gained in 22<sup>nd</sup>day of male wistar strain rats.

sgot_post	1.00	2.00	- 891.69000 *	15.80705	.000
		3.00	71.54000 *	15.80705	.000
	2.00	1.00	891.69000 *	15.80705	.000
		3.00	963.23000 *	15.80705	.000
	3.00	1.00	-71.54000 *	15.80705	.000
		2.00	- 963.23000 *	15.80705	.000

Based on the table above shows that after being treated with cherry leaf decoction (*Muntingia calabura L.*) for 7 days, there was a significant difference in serum serum levels of glutamate oxaloacetate transaminase (SGOT) between the treatment groups who were given water treatment with cherry leaf decoction (*Muntingia calabura L.*), the positive control group who were not given water therapy to drink cherry leaves (*Muntingia calabura L.*) was only given food and drink as usual, and the negative control group whose liver was not damaged and only

fed and drank as usual and as a comparison group ( $p < 0,05$ ). Decrease in serum levels of serum glutamate oxaloacetate transaminase (SGOT) in group 1 (treatment group) due to substances contained in the treatment of decoction of cherry leaves (*Muntingia calabura L.*) that have been given to the research object. Hepatoprotective cherry leaf extract can be explained through each of its phytochemical compounds, namely flavonoids have been reported to have antioxidant, anti-inflammatory, and hepatoprotective properties. Saponins also exhibit hepatoprotective activity through their antioxidant and anti-inflammatory properties. Tannins are also known to have the ability to ward off free radicals, anti-inflammatory, and hepatoprotective (Mahmood ND, 2014). Cherry leaves extract (*Muntingia calabura L.*) in previous studies have been proven to have hepatoprotective potential through two main mechanisms, namely as an anti-inflammatory and antioxidant. Scientifically, it has been proven that cherry leaves have a variety of pharmacological activities including antioxidants, anti-lactus, antinociceptive, antipyretic, anti-inflammatory, antiproliferative, and antistafilokokus (Mahmood ND, 2014). Various reports have also shown that antioxidant and anti-inflammatory activities play an important role in the mechanism of hepatoprotective activity (Rofiee MS, Yusof MIM, AbdulHisam EE, Bannur Z, Zakaria ZA, Somchit MN, 2015).

**Table 3 .** The results of serum levels of glutamate pyruvate transaminase ( SGPT ) were found on the 15th day in male Wistar strain rats .

sgpt_pre	1.00	2.00	22.93000	15.08954	298
		3.00	106,10000 *	15.08954	.000
	2.00	1.00	-22.93000	15.08954	298
		3.00	83.17000 *	15.08954	.000
	3.00	1.00	- 106.10000 *	15.08954	.000
		2.00	-83.17000 *	15.08954	.000

Based on the table above shows that after the research object was induced paracetamol 120 mg / oral for 7 days and before the research object was given a treatment of cherry leaf

decoction (*Muntingia calabura L.*). there was no significant difference in the value of serum levels of SGPT (Serum Glutamate Pyruvate Transaminase) between groups ok 1 (treatment group) with group 2 (positive control group) caused by induction of paracetamol (p = 298). The table above shows a significant difference in serum levels of SGPT (Serum Glutamate Pyruvate Transaminase) between group 1 (treatment group) and group 3 (negative control group) (p <0.05).

**Table 4.** The results of Serum Glutamate Pyruvate Transaminase (SGPT) levels were found on the 22nd day in male Wistar strain rats.

sgpt_post	1.00	2.00	- 949.81000 *	17,89960	.000
		3.00	36.57000	17,89960	.121
	2.00	1.00	949.81000 *	17,89960	.000
		3.00	986.38000 *	17,89960	.000
	3.00	1.00	-36.57000	17,89960	.121
		2.00	- 986.38000 *	17,89960	.000

Based on the table above shows that after being given cherry leaf decoction therapy (*Muntingia calabura L.*) for 7 days there was a significant difference (p <0.05) in the value of Serum Glutamate Pyruvate Transaminase (SGPT) in the group 1 (treatment group) that were given water treatment with cherry leaf decoction (*Muntingia calabura L.*) and group 2 (positive control group) were not given water treatment with cherry leaf decoction (*Muntingia calabura L.*) that only given food and drink as usual. The results of this data are due to substances contained in the treatment of cherry leaf decoction (*Muntingia calabura L.*) that have been given to research objects that can reduce levels of Serum Glutamate Pyruvate Transaminase (SGPT) in the liver. However there was no significant difference between the Serum Glutamate Pyruvate Transaminase (SGPT) treatment group and the negative control group (p = 0.121).



## DISCUSSION

### Conclusion

1. The administration of 120 mg / oral of paracetamol for 7 days can damage the liver which is characterized by an increase in the value of Serum Glutamate Oxalacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase ( SGPT )
2. Cherry leaves boiled water treatment (*Muntingia calabura L.*) that given for 7 days at a dose of 3.6 cc / oral can reduce the value of Serum Levels Of Glutamate Oxaloacetate Transaminase (SGOT) and Serum Glutamate Pyruvate Transaminase ( SGPT ) of male wistar strain rats with acute hepatitis model.

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